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THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

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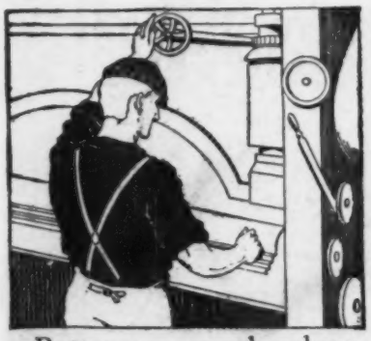

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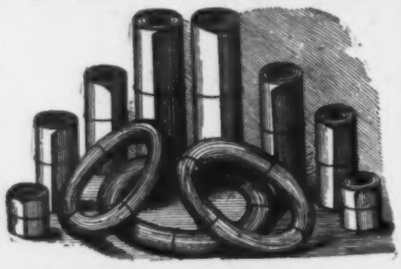

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THE IRON AGE.

THURSDAY, MAY 25, 1899.

A New Type of Air Compressor.

Pneumatic appliances are becoming such an important factor in ship construction that the accompanying description of a new type of compressor now in successful operation should be interesting.

As is well known the Chicago Ship Building Company, Chicago, Ill., have gone into the matter of pneumatic tools, as applied to ship work, further than any other concern, and it is in their works that such tools have reached their highest development. Three years ago the company had in operation one 12¼ x 14 inch belted Ingersoll-Sergeant compressor. A year later they had added another machine of the same make 20¼ x 24 inches, steam driven, though it was at the time far larger than actually required. One year ago both compressors, even though

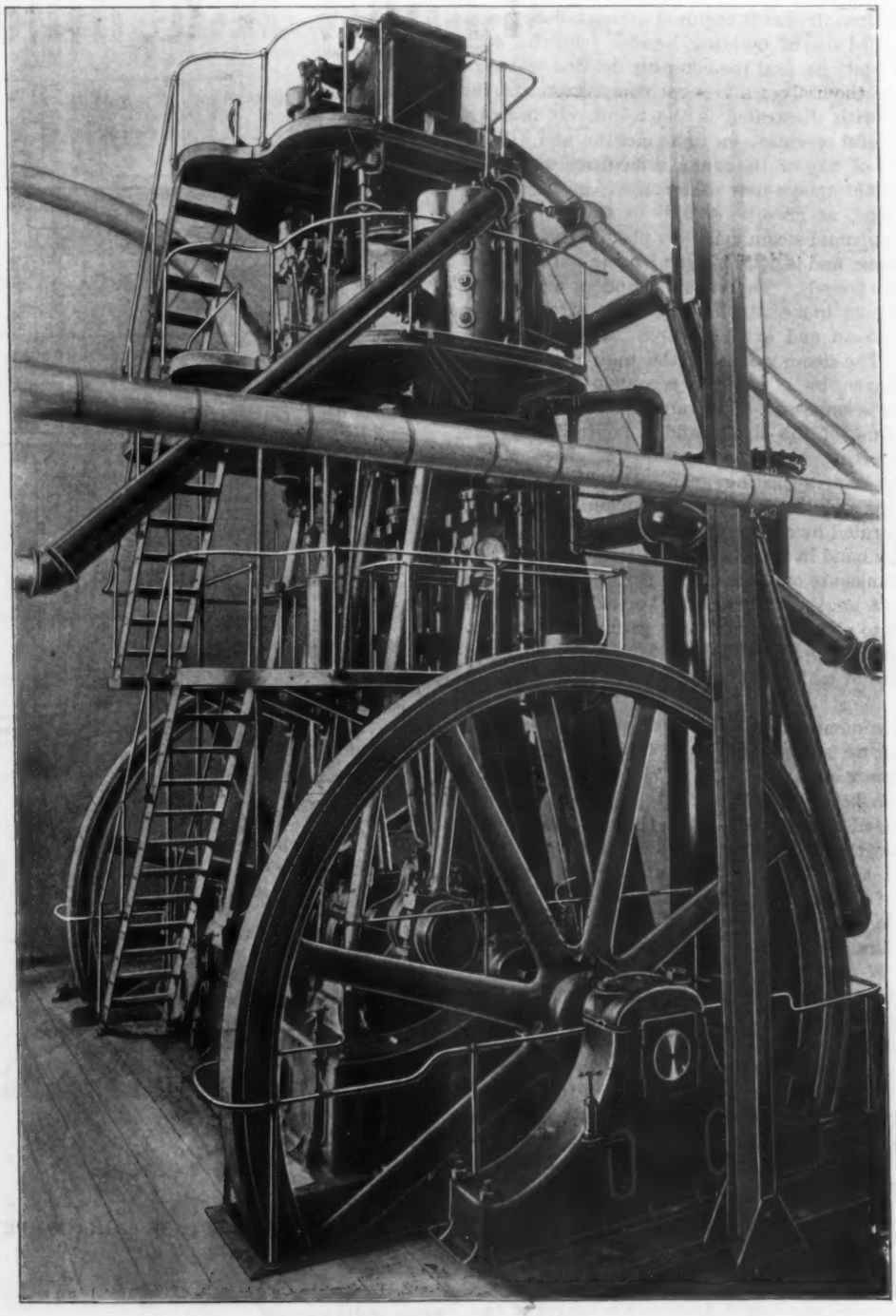


Fig. 1.—General View.

COMPOUND TWO-STAGE AIR COMPRESSOR, BUILT BY THE CHICAGO SHIP BUILDING COMPANY, CHICAGO, ILL.

operated at speeds up to 50 per cent. above builder's rating, were found totally unequal to the demands. It was calculated at that time that 1000 cubic feet per minute compressed to 100 pounds was a minimum to be provided for. It was then decided to provide increased compressor capacity, and in view of the rapid extension of the appliances of compressed air it was decided to provide a liberal margin. Higher pressures having also proved advantageous, a machine capable of compressing 3000 cubic feet per minute to a pressure of 125 pounds was fixed upon.

But here a difficulty presented itself. Two-stage compression was a necessity, and economical operation of course demanded that the fullest advantage be taken of expansive steam working. All of the machines presented fulfilling these requirements required so much floor space, with the entailed size of building, besides requiring such extended foundations, that the company decided to design and build for themselves a vertical compressor, and the machine herewith illustrated is the result. It has now been in successful operation for some months, and with an entire absence of any of the minor difficulties which are usually attendant upon a new design.

The machine, as may be seen, is of the three crank type, with compound steam cylinders placed tandem over the center crank, and is operated condensing with a steam pressure of 125 pounds. The steam cylinders are respectively 19 and 42 inches diameter with a stroke of 42 inches. All steam and exhaust valves are of the semi-rotary type. The steam valves for the high pressure cylinder are driven by a separate eccentric and Corliss releasing gear is employed. The range of cut off is from 10 to 80 per cent. of the stroke, and is controlled by the air pressure acting on a small counterweighted piston operating the cam adjusting gear. The high pressure exhaust valves and the low pressure steam and exhaust valves are operated by a second eccentric. All valves can be operated by hand in the usual way.

The air cranks are opposite each other, the steam crank being at right angles with them. The effect of this arrangement is to give a very uniform turning movement, the maximum turning effort of the steam crank coinciding with the period of maximum compression and consequent resistance.

The air cylinders are placed over the outer cranks. The low pressure air cylinder is 33 inches diameter and the high pressure air cylinder is 19 inches diameter, the stroke of both being 42 inches. The low pressure inlet valves are moved mechanically by an eccentric and are of the semi-rotary type. The low pressure discharge valves and both inlet and discharge valves of the high pressure cylinder are of the poppet type, spring loaded. The whole set have been taken out, examined and replaced in less than two hours by two men. The poppet valves are forged solid, of nickel steel with steel seats, and are of large area. Clearance in all cylinders is of course reduced to the very minimum.

The system of cooling employed in this machine is deserving of mention. The usual water jackets are provided on the cylinder, but a positive effective circulation is obtained by the manner of coring the jackets, by which the cooling water is compelled to make the complete circuit of each cylinder four times. A large intercooler is provided, which is 45 inches in diameter and 13 feet 8 inches high, containing 341 1¼-inch tubes, with 415 square feet of cooling surface. The cooling water enters first the jacket of the high pressure air cylinder, thence to the bottom of the intercooler, through the tubes of which it passes, and from the top it flows to the jacket of the low pressure air cylinder. The water is afterward used for boiler feed, thus utilizing the heat it absorbed in its passage through the machine. The air is compressed in the first cylinder to a pressure between 25 and 40 pounds, depending upon the speed at which the machine is operated, and is delivered to the intercooler, entering it at the top and leaving it at the bottom. There are thus no pockets or dead spaces in either the water or air passages through the intercooler, each flowing in the direction naturally due to its changing temperature. The quantity of water used is very small, and that the arrangement of jackets is efficient is shown by the low temperature of the air at discharge, which is not over 125 degrees. This will be lowered somewhat when the intake pipe is completed, so that air will be taken from outside the building.

The long stroke employed also is an advantage in this respect: that the cooling surface for a given capacity is greater than with shorter stroke and larger diameters. It is of advantage also in other respects—namely, the percentage of clearance is smaller, the life of valves is extended, working strains are reduced and quiet running is more easily secured.

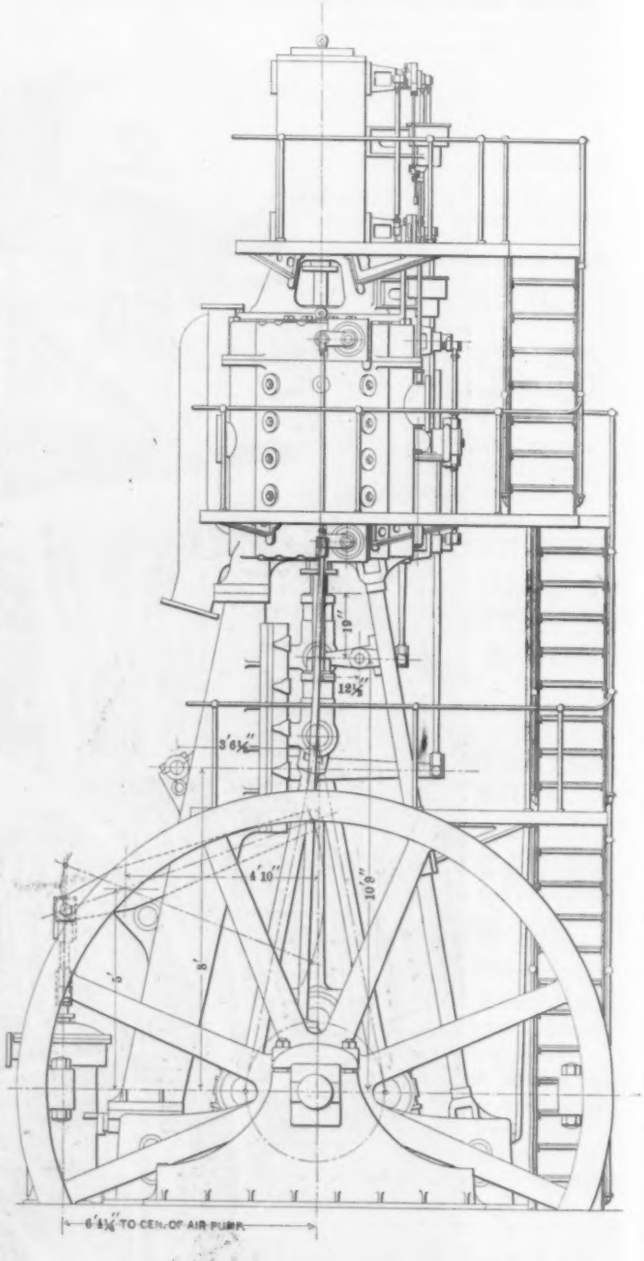


Fig. 2.—Elevation.

COMPOUND TWO-STAGE AIR COMPRESSOR.

The crank shaft is of steel 11 inches diameter in journals, 13 inches at the wheel seats, with journals 19 inches long. The cranks are steel castings. The steam cranks are counterbalanced and the pins are of forged steel 9 inches diameter 10 inches long.

The bed plate is in one casting with four main journals; an outboard bearing is also provided outside of each fly wheel. The wheels are 15 feet in diameter and weigh 15,000 pounds each. The total floor space required for this machine is 15 x 22 feet and the total hight from floor

line as shown is 29 feet. As can be seen, every part of the machine can be got at freely, whether in motion or not. It should be noted that the slides are also water jacketed, a portion of the cooling water flowing through them on its way to the high pressure cylinder.

This machine is now compressing about 2900 cubic feet per minute to 100 pounds at an average speed of 70 revolutions, and does this work on a steam consumption not much in excess of that of the old machine delivering 800 cubic feet at the same pressure.

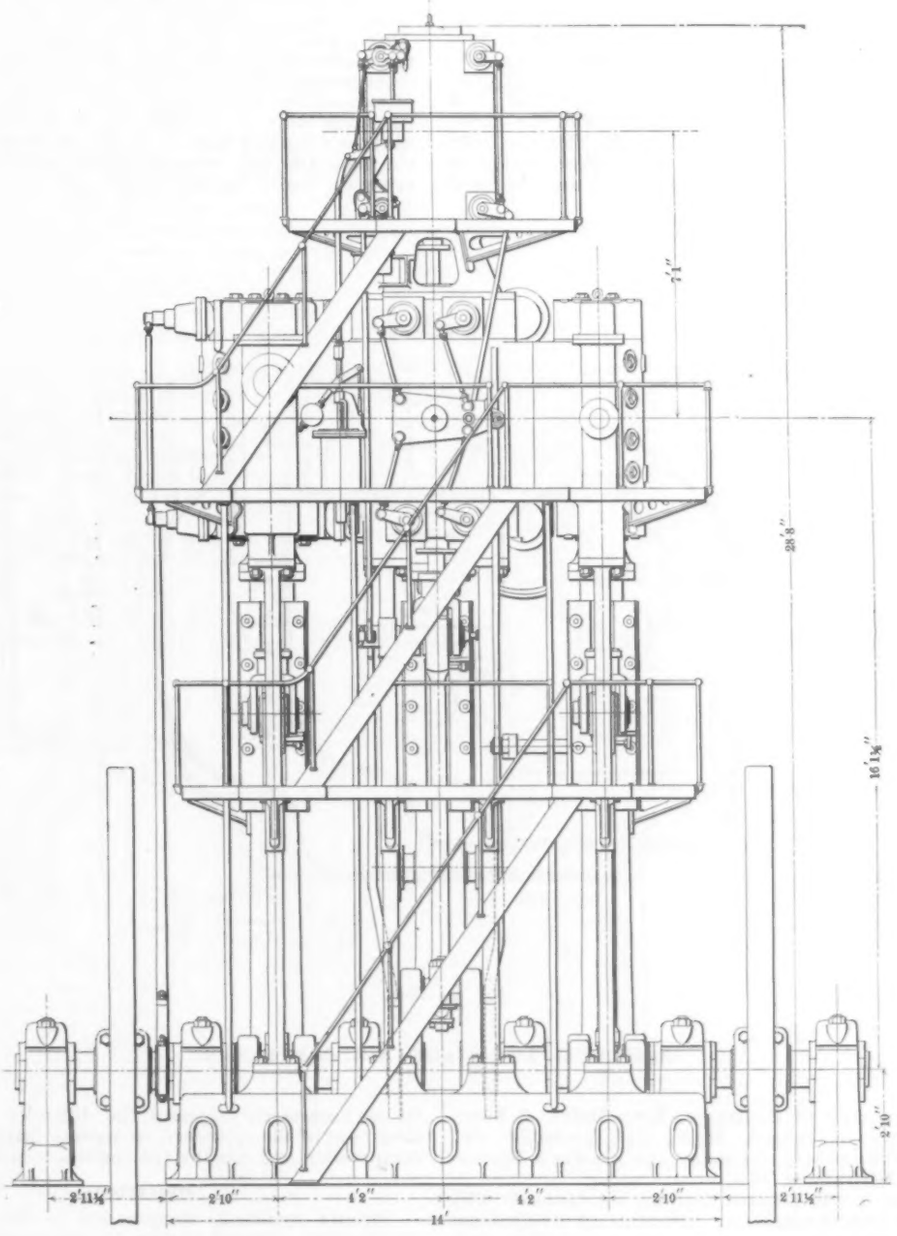


Fig. 3.—Front Elevation.

COMPOUND TWO-STAGE AIR COMPRESSOR

To the Chicago Ship Building Company, with their fine machine shop equipment, the building of this machine presented no particular difficulties of a mechanical nature, but it is safe to say that not many concerns would have so readily grappled with a new problem, at a time when difficulty or failure meant practically suspension of operations in the yard, and so successfully solved it.

At West Superior, Wis., on the 18th inst., the docks, machinery, coking ovens and real estate of the Lehigh Coal & Iron Company were sold at receiver's sale under the decree of foreclosure brought by the American Trust & Savings Bank of Chicago. As no outside bidders appeared, Chairman W. B. Banks of the Reorganization Committee bid the property in for the bondholders at $60,000. The bid was in behalf of the bondholders who have gone into the reorganization plan, some $600,000 out of $800,000, and the proceeds will apply to them, but in reality they will own the docks. The stockholders are out.

The Plumbers' Supply Combination.

The organization of the American Plumbing Supply & Lead Company, recently incorporated with a capital of $35,000,000, is making good progress. A temporary organization was effected last week, which will hold good until the regular meeting, to be held as soon as all the preliminary details are completed, probably about June 1. The leading officials of the new company have been selected, and it is understood that Francis J. Torrance, president of the Standard Mfg. Company of Pittsburg, Pa., will be the president of the concern. B. Frank Hooper, president of the Colwell Lead Company of New York, who is now acting as treasurer *pro tem.* of the company, will continue in that office, and E. H. Murdock of the Sportsman's Shot Works of Cincinnati, Ohio, is mentioned for the secretaryship. The new company, we are advised, will be in actual operation by June 1, at which date all those concerns who have already given

in their adherence will turn over their plants to the combination. It is likely, however, that not all the firms expected to be included will be absorbed at that time, as some of them have options running until July 1. But a majority of them, embracing the more important concerns, will join at that time.

From the present outlook it seems that about 36 different plants will form the constituency of the new combination. An important development, made known this week, was the acquisition by the company of the J. L. Mott Iron Works of New York, one of the very largest plumbing supply concerns in the trade. In addition to that interest, we learn that options on the following concerns have been accepted: Standard Mfg. Company, Pittsburgh Supply Company, Mansfield Mfg. Company, Bailey-Farrell Mfg. Company and W. B. Scaife & Sons of Pittsburgh, Pa.; the nine plants of the American Shot & Lead Company of St. Louis, Mo.; Colwell Lead Company of New York City; Dawes & Myler of New Brighton, Pa.; Raymond Lead Company and the E. W. Blatchford Company of Chicago; the E. Stebbins Mfg. Company of Brightwood, Mass.; the Pierce, Butler & Pierce Mfg. Company of Syracuse, N. Y.; the Ahrens & Ott Mfg. Company of Louisville, Ky.; Buick & Sherwood Company of Detroit, Mich., and, probably, the Hoffman & Billings Mfg. Company and Rundle & Spence Company of Milwaukee, Wis.

By this list it will be seen that the combination will embrace plants manufacturing substantially everything in the whole range of plumbers' supplies, including cast iron pipe, brass goods, bathtubs, kitchen boilers, tanks, gas and steam goods, plumbers' wood work, and all lead and copper goods and material. The lead interests, however, will predominate very materially. The new company will have plants in a dozen different States, and arrangements will be made for the distribution of sales so as to economize in freight charges, and in every direction reduction in the cost of operation and of transacting business will receive close attention. The executive heads of the concern will all be men of practical experience in the business. The company will have headquarters in New York, Chicago and Pittsburgh. Offices have already been secured in the American Surety Building, Broadway, New York.

We are in receipt of a handsome chart of the world just issued by the International Express Company, 52 Broadway, New York, showing all the lines traveled by ships employed in the world's commerce. The chart, which is 35 x 50 inches in size, was prepared by the Hydrographic Department of the United States Navy and reproduced at considerable expense by the International Express Company. To those interested in foreign trade it will be of great value. In addition to the map numerous tables are given, showing the distances by sea between all the principal ports of the world.

The Allen Valve for Locomotives.*

BY C H. QUEREAU, DENVER, COL.

There are decided differences of opinion among railroad mechanical men as to the value of the Allen, or double ported valve, a diagram of which is given in Fig. 1. Those who favor its use claim that it secures a greater mean effective pressure than the plain valve by giving a more prompt and full admission, thus increasing the power of locomotives on which it is used. Those who oppose its use claim there is no difficulty in getting all the steam into the cylinders that is needed without the Allen port, the main difficulty being to reduce back pressure and compression; that if the Allen valve gives a freer admission its use necessarily increases the difficulty of getting the steam out of the cylinders, increasing back pressure and compression and causing the engines to pound badly.

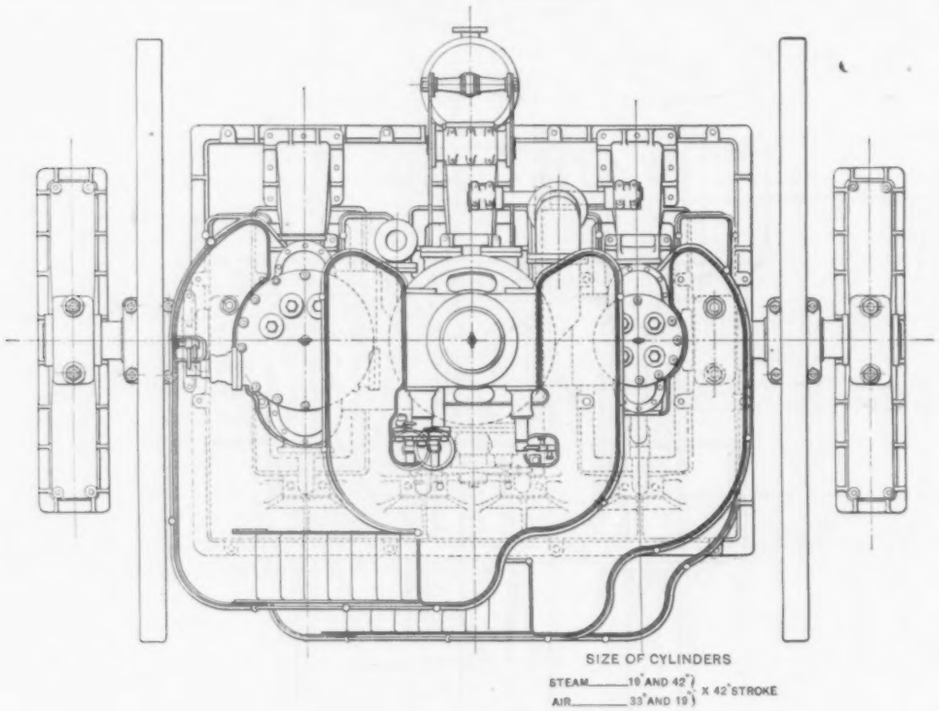


Fig. 4.—Plan.

COMPOUND TWO-STAGE AIR COMPRESSOR.

Objections.

Strictly speaking, compression is the period of the stroke from exhaust closure to lead opening. The term "excessive compression" is commonly used to denote a suddenly rising pressure at the end of the return stroke, which takes the form of a loop on the indicator card, and is usually wrongly assumed to be caused by the compression of steam remaining in the cylinder at the time of exhaust closure. If exhaust closure takes place at half stroke with 3 pounds back pressure and 8 per cent. cylinder clearance, the pressure in the cylinder at the end of the stroke will reach only 113 pounds. If the back pressure is 12 pounds and compression begins at 15 inches, the full stroke being 24 inches, the highest pressure attained at the end of the stroke will be but 137 pounds. With the usual locomotive valve gear and the valve line and line inside, compression begins at about 15 inches of the return stroke. These facts remain true whether the valve is of the common type or an Allen valve. From the foregoing it is quite evident that the Allen valve cannot produce a compression equal to the boiler pressures commonly used, and we must look elsewhere for the cause of the so-called excessive compression complained of. That this cause is

* Presented at the Washington meeting of the American Society of Mechanical Engineers.

excessive lead I believe will be clearly shown by the cards in Fig. 2, which were all taken from the same engine, having Allen valves, under practically the same conditions except a difference in lead, and which clearly prove that the Allen valve can be so set as not to produce excessive compression. (The engine from which these cards were taken had drivers 68 inches in diameter, valves with 5-inch travel in full gear, ⅜-inch outside lap, and Allen ports ½ x 17¼ inches, inside clearance $\frac{1}{16}$ inch on either end, cylinders 19 x 24 inches, and steam pressure 165 pounds.)

In view of the preceding it seems to me clear that those who criticise the Allen valve have made the mistake of assuming that the excessive compression frequently found to accompany its use is due to so free an admission of steam from the beginning of the stroke up to the cut off as to produce abnormal back pressure and compression, while the facts in the case are that the objectionable results are caused by too much lead, which can be easily remedied without losing the advantage claimed for this valve. That the objectionable feature of undue compression can be obviated seems evident from card 9 of Fig. 2.

On this card the average back pressure from the beginning of the return stroke up to the point of exhaust closure is 7 pounds. Taking into consideration the fact that the drivers were making 267.6 revolutions per minute when the card was taken, and that these are representative cards among hundreds taken under similar conditions, it seems evident that the Allen valve cannot justly be considered as producing more back pressure than the plain valve.

From the foregoing I feel warranted in drawing the conclusion that the Allen valve, when properly set, does not produce more back pressure or compression than a plain valve under similar conditions.

It is sometimes objected that the Allen port necessitates a weak design, or the valves must be made very heavy. For about ten years the Chicago, Burlington & Quincy Railroad has been using, very successfully, on 19 x 24 inch engines, having steam ports 1⅛ x 17¼ inches, Allen valves weighing only 112 pounds without packing strips.

Advantages.

It is evident that the Allen valve doubles the speed of the steam port in opening and closing for all cut offs, and

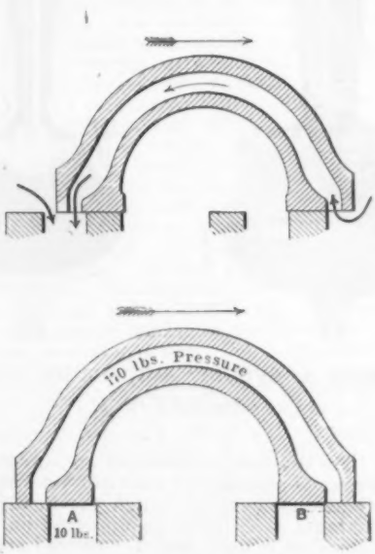


Fig. 1.—The Allen Valve.

In the Proceedings of the American Railway Master Mechanics' Association for 1896 will be found the report of their Committee on Slide Valves, from which I quote: "From this (table) it will be seen, as might have been expected, that the mean effective pressure with the Allen port is greater than without it at the ordinary running positions. The average value of all the figures shows 20 per cent. greater mean effective pressure in favor of this valve. It can be considered that the Allen port has enabled the piston to exert 20 per cent. more useful pressure on the crosshead at each stroke. It is also readily apparent that the earlier the cut off the more is gained by

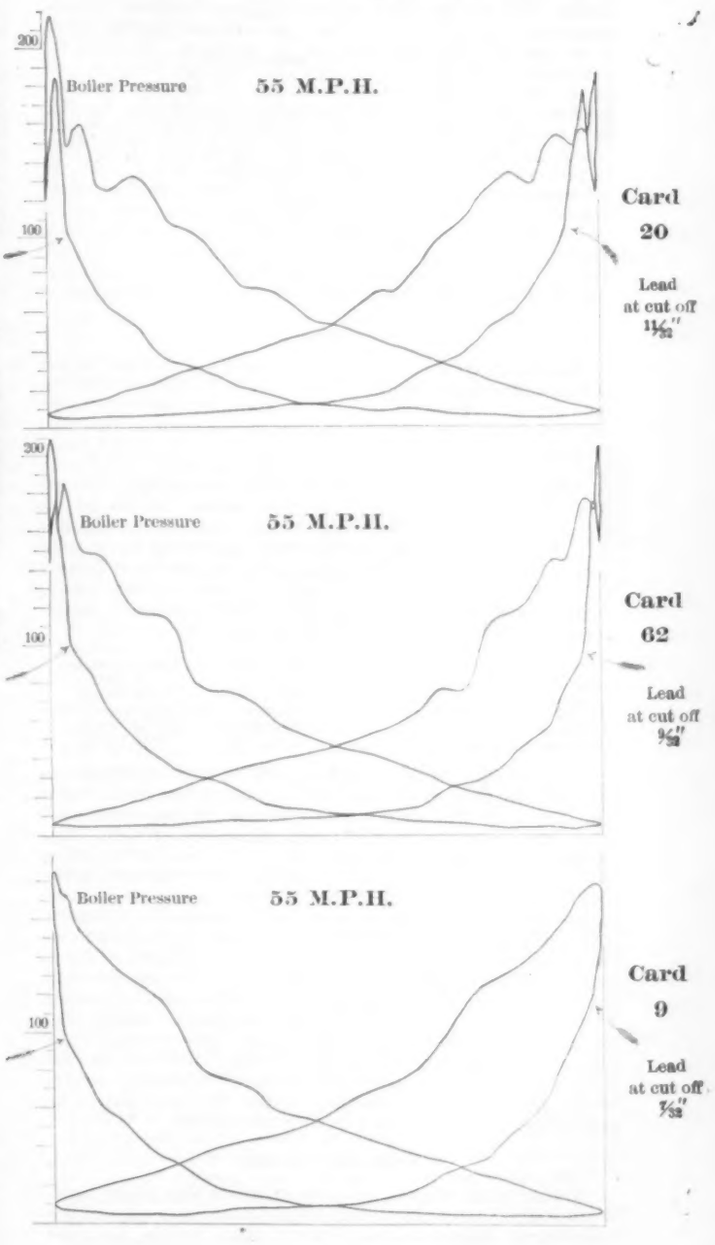


Fig. 2.—Cards.

THE ALLEN VALVE FOR LOCOMOTIVES.

in this respect more nearly approaches the advantages of the Corliss valve gear than does the ordinary valve. That this is a decided advantage can hardly be successfully disputed. It is equally evident that for all cut offs, where the maximum port opening does not exceed the width of the supplementary port, the Allen valve doubles the port opening. As the width of the Allen port is quite commonly ⅛ inch, and a maximum port opening of this amount corresponds to a cut-off of 9 inches with the usual locomotive gear, it follows that the Allen port doubles the steam opening for this and all shorter cut offs, or for all those commonly used for speeds higher than 10 or 15 miles an hour. It therefore appears evident, on theoretical grounds, that the Allen valve increases the power of a locomotive for all speeds above very moderate ones, and that this advantage will be marked for high speeds.

the Allen valves. This is also true in a measure of the increase in speed. It is also clearly demonstrated that a better steam line is obtained." The indicator cards on which these conclusions of the committee were based were made on the Purdue University mounted locomotive, at six different cut offs, varying from full gear to one-sixth stroke, and at speeds of 10, 20, 30, 40, 50 and 60 miles an hour, with the same valve gear and setting for both the plain and Allen valves.

For engines which are already built it seems plain that the Allen valve furnishes a simple method of increasing their power, and in designing new engines will produce a given power with smaller and lighter valves, because of the shorter ports in the valve seat necessary with this valve, resulting in less strain and wear on the valve gear and seats. It may be urged that a plain valve with longer

travel will give as great a mean effective pressure as the Allen valve, but this necessitates a heavier valve and consequent wear to the valve gear, and more power wasted. In this connection it should not be forgotten that the Allen valve enlarges the port opening by a given number of square inches for all cut offs, while a longer valve travel enlarges it a certain per cent., the number of inches decreasing as the cut off becomes shorter.

Economy.

Assuming it to be proved that the Allen valve will give greater power than a plain valve, it does not necessarily follow that the economy of the engine will show a corresponding improvement. This will depend on the conditions under which the engine is working. If with the plain valve the conditions are such that the work is done at the most economical point of cut off we would not expect any saving in coal by increasing the power; possibly the reverse if the basis of comparison is the pounds of water per indicated horse-power hour. But if the basis is the cost per ton mile there can be little doubt that the greater power will secure a saving. That a fuel economy may be the result is shown by Mr. Herr's remarks before the Western Railway Club: "I have endorsed the Allen valve pretty strongly, and I want to say that my experience is just the reverse of Mr. Barr's. The engines in which we put the Allen valve showed quite an apparent fuel economy."

Lead.

Inasmuch as the Allen valve gives a quicker and larger steam admission than the plain valve it follows that the lead for the former should be less than for the latter. In my opinion it has been the failure to appreciate this fact which has caused many to conclude that the Allen valve has no advantages, but rather the contrary. Not only should the lead for the Allen valve be less than for the plain valve, but must be if the best results are to be obtained. The smaller lead which the Allen valve requires is a decided advantage in several directions, as will be seen by a study of the following table, taken from Zeuner valve diagrams of a gear having ⅞ inch outside lap, ¼ inch inside clearance, 48⅛ inches link radius, 5 inches travel in full gear, and is for 6-inch cut off:

	Plain valve.	Allen valve
Lead	¼ inch	$\frac{5}{16}$ inch
Lead opens at	22⅞ inches	23$\frac{3}{16}$ inches
Maximum port opening	$\frac{7}{16}$ inch	$\frac{14}{100} + \frac{7}{16} = \frac{29}{100}$ inch
Release begins at	13$\frac{3}{16}$ inches	13$\frac{7}{16}$ inches
Compression begins at	18 inches	18¼ inches

If we assume that the Allen port is half as efficient as the port opening at the end of the valve, the Allen valve has increased the steam port opening 20 per cent. even after the lead has been reduced nearly 38 per cent. The reduction in lead made possible by the use of the Allen valve has delayed exhaust opening, thus increasing the period of expansion ¾ inch, or 3 per cent., has also delayed exhaust closure ¾ inch, or 3 per cent. These results, due to the reduction in lead, are equivalent to reducing the inside clearance from ¼ to $\frac{5}{16}$ inch so far as expansion is concerned, and increasing the inside clearance from ¼ to $\frac{5}{16}$ inch so far as the effect on comparison is concerned. There can be no reasonable doubt that these changes introduced by the Allen valve will increase the power of an engine except at very slow speeds, and will favorably affect its economy except when the engine with plain valves is working under the most favorable conditions, which are rare in railroad service.

Indicator Cards.

It may be of interest to some to know that cards taken from Allen valves on single expansion engines can be distinguished from those taken when plain valves are used. Those from Allen valves have a wavy compression line, such as may be seen on the cards in Fig. 2, while on those taken from plain valves the compression line is a simple curve. The cause for the compound curves on the Allen valve cards I believe to be explained as follows: Fig. 2 shows an Allen valve and seat. Cut off has just taken place at steam port B, and the supplementary port is filled with steam at nearly boiler pressure, perhaps 170 pounds. At A exhaust closure is about to take place, when the port and that end of the cylinder will be filled with steam at exhaust pressure, say 10 pounds. As soon as the valve has moved a little further to the right the supplementary port will be brought into communication with port A, when the high pressure steam in the supplementary port will expand through A, increasing the pressure there and giving the indicator piston a sudden impulse which will cause it to vibrate till lead opens. This explanation is substantiated by the fact that the greater the cubical contents of the Allen port the more pronounced are the reverse curves.

The Youngstown Steel Roofing Company, Youngstown, Ohio, have just installed a second expanded metal lath machine, with a capacity of working 700 yards of expanded metal lath in ten hours. The company have enough orders on their books to keep both machines at full work for a long time to come.

The D'Esté & Seeley Air Spring Pressure Regulator.

In the pressure regulator made by the D'Esté & Seeley Company, 29 Haverhill street, Boston, an air spring is substituted for the usual method of regulation by means of weights and levers or springs. As shown in the sectional cut, the air spring is formed in an air tight chamber, of which the diaphragm (which carries the main valve) forms one side. With a bicycle pump air is pumped into this chamber, and its pressure on the diaphragm pushes the valve open and holds it open until the low pressure on the opposite side of the diaphragm forces it to its seat. It is thus seen that any high pressure is reached by simply pumping into the chamber, and any low pressure by letting air out of the chamber, while the air itself forms a singularly elastic and perfect spring, fully supporting every part of the surface of the diaphragm on one side, against the equal pressure of the fluid on the other side. The diaphragm is simply an elastic partition between two equal pressures, a very different thing from the ordinary arrangement, in which the flexible portion of the diaphragm is entirely unsupported on one side. The valve itself is double seated, balanced and frictionless, and can thus be influenced by the slightest change in pressure, while the sensitiveness of the air spring is entirely controlled by the size of the air chamber. Another valuable feature (especially for steamships) is that the air chamber need not, of necessity, be bolted on to the valve, but may be placed in any convenient position and at any distance away, if it is only connected by a tight pipe to the cover which clamps the diaphragm to the valve. It may be placed where the external temperature is uniform. Another convenient feature is that the filling pipe of the air chamber may be brought down on the wall or supporting column to a convenient point, with the fitting (to which the air pump is connected) on the end of it. The most common and obvious use of the regulator is in steam heating, where it is used to reduce any varying high pressure to any constant low pressure that may be desired. By its use steam may be maintained in the boilers at high pressure sufficient to run a steam engine or elevator, and yet be reduced for heating to atmospheric or very low pressures, thereby entirely preventing the snapping and cracking in radiators and heating pipes, also preventing the wear and cutting of the seats of the globe valves. In exhaust steam heating the regulator automatically supplies just the amount lacking to maintain constant low pressure, say at atmospheric or even below.

THE D'ESTE & SEELEY AIR SPRING PRESSURE REGULATOR.

Jones and Laughlins, Limited.

The American Iron and Steel Works.

Through the courtesy of W. L. Jones, general superintendent, a representative of *The Iron Age* was recently shown through the large works of Jones & Laughlins, Limited, located on the South Side, Pittsburgh. It is hardly necessary to state that this firm are known all over the United States wherever iron and steel are used, and in the last couple of years they have developed a very considerable foreign trade on some of their finished products. The works are located between Carson street and the Monongahela River, and extend from Twenty-fifth and Sidney streets up Carson street to Thirty-second street and occupy nearly 50 acres of ground. The firm have added very largely to their property holdings in the last year and now have a good deal of vacant ground, which will be used for extensive additions to the plant, some of which have already been commenced. We shall first describe the

Bessemer Plant.

This was erected originally in 1886 and contains two 9-ton vessels 8 feet 6 inches in diameter. Cupola metal is used, but it is proposed to use direct metal, bringing it across the Monongahela River in mixers from the Eliza furnaces by way of the Monongahela Connecting Railroad and bridge owned by Jones & Laughlins, Limited. The pouring ladles are transferred to an overhead pouring arrangement, leaving the cranes free to be used for other operations. There are six 10 foot cupolas which are served by a steam hoist, and the metal is tapped directly from the cupola into ladles, from which it is poured into converters without the interposition of runners of any kind. Casting is done on cars, and ingots are stripped by an inclined stripper which delivers the ingot directly under the transfer, which charges it into the pit furnaces. These furnaces are so arranged that ingots may be delivered from any pit to either of the three blooming mills with which the plant is equipped. These

Three Blooming Mills

are numbered 1, 2 and 3 and are in many respects alike. In the practice at mills Nos. 1 and 2 the transfer draws the ingots from the pit and delivers them onto the table rollers without rehandling of any kind. In mill No. 3 the ingots are placed on a car and conveyed to the blooming mill, being delivered in the tables in a horizontal position by means of a tilting arrangement. Mills 1 and 2 are practically duplicates, all working parts being interchangeable. A continuous billet mill is connected to No. 1 blooming mill, making billets of all sizes down to 1½ inches square, the whole ingot, after being roughed on the blooming mill, being finished into billets without reheating. On leaving the continuous mill the billets are sheared by a flying shear, which cuts the moving piece into the desired lengths as it leaves the rolls. After being sheared the pieces are carried by rollers and a chain elevator to a cooling bed and after inspection are loaded directly into cars for shipment, any rejected billets by an ingenious device being loaded into separate cars. The entire arrangement makes a complete and efficient mill and a very economical one. Some excellent records for production have been made on this mill.

Blooming mill No. 2 is used for supplying the various finishing mills with a great variety of blooms and billets. No. 1 mill is driven by a pair of 28 x 48 engines and No. 2 by a pair of 30 x 60 engines, the gearing of both being in the ratio of 2 to 1.

No. 3 blooming mill is a powerful modern mill with a pinion diameter of 40 inches and rolls 7 feet long between bearings, counterbalanced by hydraulic pressure. It covers a wide range of work, making billets and slabs from 4 x 4 inches up to 24 x 10 inches, and also a large variety of beam shapes. The mill is notable for its simplicty and strength, the only gears about it being the miter gears, which drive the table rollers, and the gear and pinions which are a part of the screw actuating device. The tables are very strong but simple in construction, each being driven by a separate engine connected directly to the side shaft of the table without a countershaft or gearing. This method has also been applied to the tables of the other two blooming mills. The ingots are handled on the tables by a very simple manipulator, which consists of two hydraulic cylinders, one situated on each side of the table, the piston rods of which carry suitably shaped heads, and these are forced against the ingot on the table, or hold it, as the roller may desire. This mill is driven by a powerful Mackintosh-Hemphill engine of 10,000 horsepower, with cylinders 50 inches diameter and 72-inch stroke, the engine being coupled directly to the wall without gearing. This engine was fully described in *The Iron Age* of November 5, 1896. After leaving the blooming mill the blooms and slabs are cut to the required lengths by a hydraulic shear, which is arranged to use two pressures, a low one for the smaller pieces and a high one for the larger ones, this arrangement greatly economizing the power. This hydraulic shear is also fitted with a complete table, which does away largely with the labor and enables the shear to make a square cut by holding up the ends of heavy slabs outside the shear knives. The table is arranged to move away from the shears when an end is to be cut in such a manner that the scrap falls directly into a chute, which delivers it into scrap cars by a conveyor. The finished material passes directly to another table, from which it is pushed by a hydraulic cylinder directly into special cars, each car holding from 10 to 20 tons, where it is allowed to cool, and is then transferred by traveling cranes directly into cars for shipment. All sizes of billets and slabs are handled by this device, and on account of the great variety of sizes made it has proved its entire efficiency.

The Open Hearth Plant.

The open hearth plant consists of six 40-ton basic open hearth furnaces built by the S. R. Smythe Company of Pittsburgh. They are arranged in two parallel rows in such a manner that either of the two 75-ton electric overhead traveling cranes can be used from the ladle of any of the furnaces. The furnaces are placed on the general level, the ladles being lowered into a pit to receive the metal when the furnaces are tapped. The casting is on cars and the ingots are stripped by an overhead stripper, from which they go directly to the same transfers and are charged in the same pit furnaces as the ingots from the Bessemer plant. The furnaces are served by two Wellman chargers, one being arranged for each three furnaces, a large proportion of the scrap boxes being filled at the different places in the mills where scrap originates and are conveyed directly to the furnaces without rehandling.

Finishing Mills.

After leaving the blooming mills a very large proportion, in fact nearly the entire output, of the Bessemer and open hearth plants, is made into finished material, Jones & Laughlins being one of the largest producers of iron and steel in finished forms in the world. These finishing mills consist of four 8-inch trains, one 9 inch, one 10-inch, two 12-inch, two 16 inch, one 20-inch and one 26-inch mill, besides a sheet train, a small plate mill and a combination mill for small sizes of steel. The product of these finishing mills covers a very wide range from half rounds 3-16 inch in diameter up to 20 inch beams. A feature of the business of this concern is the great variety of special and agricultural shapes which they make. With such a large number of finishing mills it is possible, and the plan has been adopted by this concern, of having each mill adapted to a particular class of work. Advantage of this practice has been taken throughout the entire plant, nearly every mill being possessed of special features for the rolling of its own particular class of product. A striking example of this is seen in the combination mill, which makes great quantities of small rounds, squares and flats. On this mill the billets from the continuous heating furnaces are fed directly into a continuous roughing mill and finished in the ordinary manner in very long lengths, while the 20-inch mill, whose product consists of beams, channels and angles, is fitted with tables operated entirely by electricity which require but a single man, the operator on each side of the rolls.

The changed conditions which have come into the manufacture of structural material during the last few years require work to be done by the makers of beams and channels which was formerly performed by the purchasers at their own shops. To meet the demands of customers who must have their material ready for erection this firm have installed in the last few years a great variety of shears, punches, straightening machines of all descriptions and special tools. The equipment of these works in this respect is most complete, and too extensive to describe in detail in this article. In connection with the structural department is a separate shop devoted to the manufacture of "Larimer" columns, which have been used extensively for some years and of which Jones & Laughlins are the exclusive manufacturers.

Shipping Facilities.

The handling and shipping of material when finished is an important factor in economical operation of a large works, and the greater the tonnage the more important this item becomes. This department has been given the closest attention and the very best results secured. The firm have recently completed an extensive shipping yard covered by a network of electric overhead traveling cranes, and which is a model of its kind. Including these yard cranes there are in use throughout the works for various purposes 25 electric traveling cranes, besides steam locomotives and hand cranes in great variety, including a cantilever crane of 312 feet span, which was until recently the largest span crane in the world. It was built by the Brown Hoisting & Conveying Machine Company of Cleveland, Ohio.

There is probably not a concern in the United States engaged in the manufacture of iron and steel, or for that

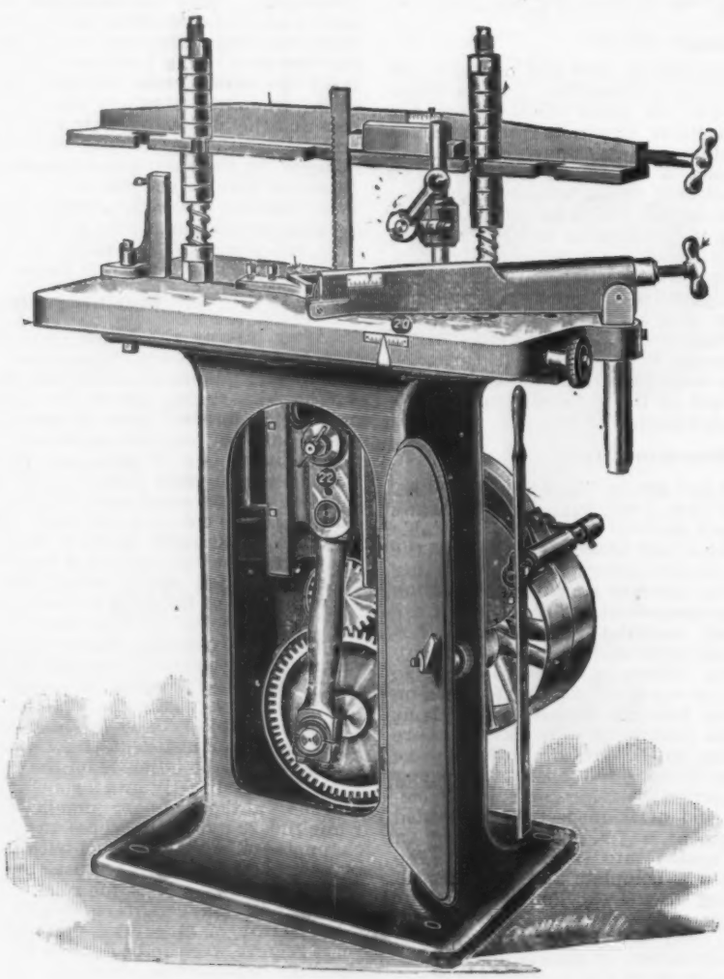
matter anywhere in the world, whose diversity of product is so great as that of Jones & Laughlins. Of the various forms of finished steel made by this concern we can mention steel bars, rails, plates, sheets, structural shapes, steel billets, railroad splice bars and bolts, boat and railroad spikes, machine and bridge bolts, chains, railroad coupling links and pins, forgings, steel castings, cold rolled shafting, finger bars, couplings, hangers, pillow blocks and pulleys. Connected with the plant are two large foundries, the firm making all their own castings, chain factory, a bolt factory and machine shops. The annual capacity of the foundries is 17,500 gross tons of iron and 2500 tons of steel castings; of the cold rolling department, 25,000 tons of shafting and finger bars; of the chain factory, 25,000 tons of chain and railroad coupling links; of the bolt factory, 8000 tons of bolts, spikes and railroad coupling pins, and of the shops for fitting structural material, 24,000 tons. The firm also have large machine shops which are equipped with tools of modern design, and they have facilities for producing pulleys and balance wheels up to 30 feet in diameter, and can handle castings up to 50 tons.

The firm are an identified interest of Laughlin & Co., Limited, and are large manufacturers of Bessemer pig iron and also purchase in the open market. At the present time Laughlin & Co., Limited, are operating three blast furnaces, rebuilding a fourth and constructing a fifth. It is the intention to rebuild three of the present stacks, making them the largest in the world, and also to build an entirely new stack, which will give them a complement of five, each with a daily capacity of about 600 tons. One of the furnaces to be rebuilt is Soho, which this concern have operated under lease for two years, but now own. It should therefore be added to the number of stacks owned and operated by Laughlin & Co., Limited. With these five furnaces completed and in operation Laughlin & Co., Limited., will be able to supply Jones & Laughlins, Limited, with over 2500 tons of Bessemer and basic pig iron every 24 hours, sufficient to meet their requirements.

The daily capacity of Jones & Laughlins, Limited, in Bessemer and basic steel is now about 2000 tons, and more than three-fourths of this is used by themselves in the manufacture of steel in finished forms, but it is intended to increase the finishing capacity so as to consume the entire product of pig metal.

Proposed Improvements.

As noted in the beginning of this article, the firm have bought within the past six months or so a very large amount of ground adjacent to their plant which will be utilized for extensive additions, some of which are now under way and others in contemplation. Two new finishing mills are now being built, while others will probably be commenced before long. It is also likely that a complete new Bessemer plant will be erected, much larger than the present one. It is also proposed to install before long the use of direct metal. In the shipping yards very extensive improvements are under way, and when completed will give this firm additional facilities for receiving and shipping product. The original plant of this concern was established in 1852 and the firm have had a long and honorable career in the iron trade of nearly 50 years.



THE DAVIS KEY SEATER.

The Davis Key Seater.

The engraving represents the No. 1 key seating machine, built by the W. P. Davis Machine Company of Rochester, N. Y., which will cut seats from ¼ to 1 inch. The machine is complete with heavy clamping bar for large work, also special clamping lever for small work. The feed has automatic release which prevents the breaking of cutters. The table is provided with end adjustment, and there is a graduated scale for the depth of the key seat and also a scale for regulating the taper of the seat. For centering small work there is an adjusting chuck and an adjustable clamp arm for holding small work. These attachments insure the cutting of any number of key seats of any given depth and taper.

It is announced that the Johnson Steel Company, Lorain, Ohio, will this summer spend $200,000 on homes for the workmen, office employees and officers of the company.

Handling Materials in a Foundry.*

The Methods in Use at the Works of the Michigan Stove Company, Detroit, Mich.

BY W. J. KEEP, DETROIT, MICH.

One of the results of a series of years of business depression is that those in charge of manufacturing will have time to devote close attention to each department and by improved methods of production partially compensate for decreased sales. With the advent of dull times, in 1893, the Michigan Stove Company began to devise new methods for manufacture. Probably the only portion of these improvements that would interest the general founder would be the method of handling material and the management of cupolas.

The space available for storage of flasks, coke, iron and sand is very small, which was for years considered a disadvantage, but under the changed methods it is a positive advantage. Formerly all cupola supplies were wheeled to elevators and were hoisted to the platforms and unloaded, then when the cupolas were charged the materials were placed on scales and weighed and handled again in charging. While using elevators it was necessary to maintain inclined runways to be used in case of frequent derangement of elevators. It was found that wheelers would stop to rest about so often, and invariably would wait at bottom and top of elevator for one reason or another, therefore when the elevators

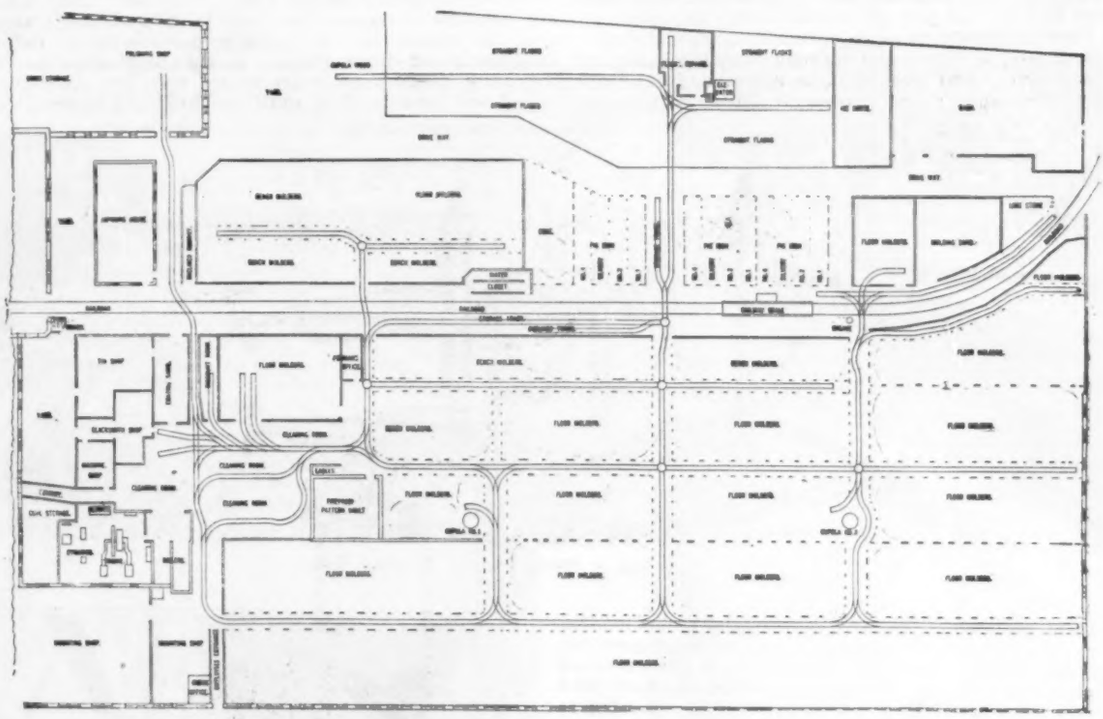


Fig. 1.—Plan of Industrial Railway on Ground Floor of Foundry.

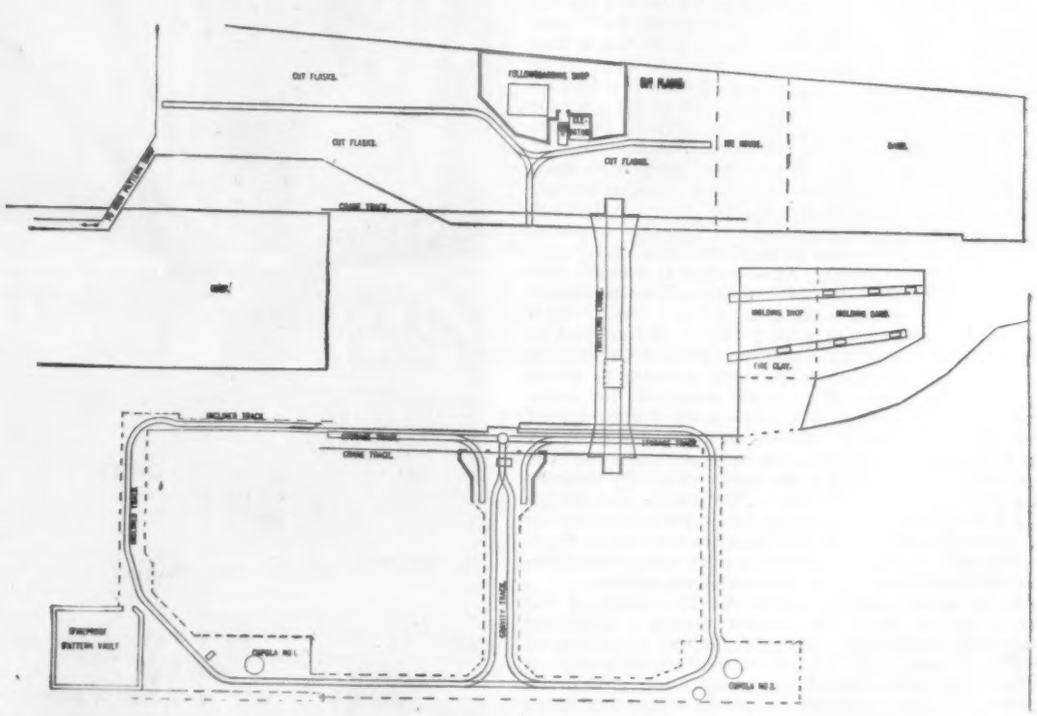


Fig. 2.—Plan of Industrial Tracks on Second Floor.

ORIGINAL METHODS FOR HANDLING MATERIALS AT MICHIGAN STOVE COMPANY'S WORKS.

* Abstract of paper presented at the Pittsburgh meeting of the American Foundrymen's Association.

wore out they were not replaced and it was found cheaper to use the inclined ways exclusively.

cars each containing three boxes of sprues. A car with pig iron is lifted from the iron yard to the weigh house,

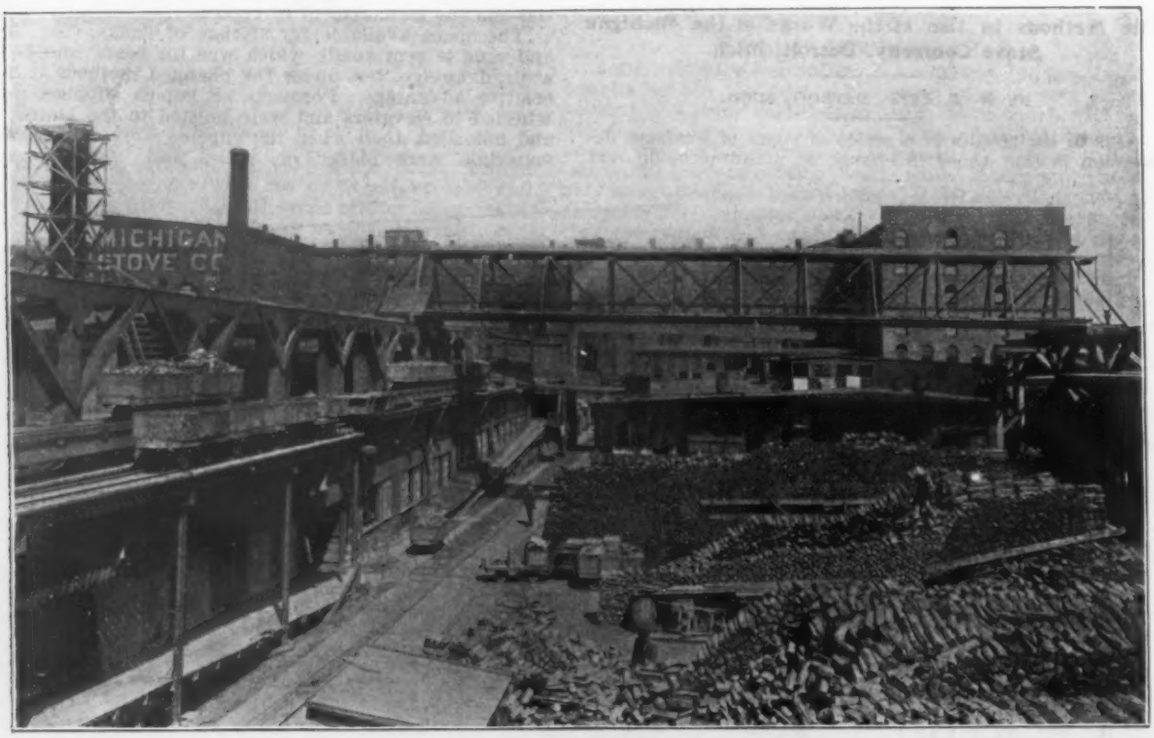


Fig. 3.—Rear View of Works, Showing Traveling Crane.

All of the melted iron is taken in hand ladles holding 50 pounds, therefore there is no use for appliances for carrying melted iron. The railroad track on which all supplies are received is located between the iron yard and the foundry, making it necessary for all materials to cross the railroad track in going to the cupolas.

In common with other founders, it had been impossible to have melters charge materials as they reported them, causing each year a great shortage in both coke and iron when the amount purchased was taken into account, and it was a common experience to show more castings produced than pig iron melted. Flasks had always been exposed to the weather, and could only be found by men who were familiar with their location, and who spent more time searching for flasks than in their transportation when found. The carpenter shop was located a long distance from the flask yard, requiring that flasks should be wheeled to the shop, and when ready to use should be again wheeled to the foundry. The subject of improvement in methods was under consideration for several years. At one time it seemed possible to adopt a trolley system, but difficulties appeared that finally led to the adoption of ground tracks with 20½-inch gauge, and curves with a 12-foot radius, and as few turntables as possible, requiring cars with flexible wheel base. A traveling crane was erected to reach every part of the yard. With it all materials for cupolas were hoisted to a weigh house on the foundry roof and were then sent to the cupolas on a gravity road. A two-story building was erected to hold all flasks and the carpenter shop was located in its center, with an elevator reaching the roof and each floor. Electricity was adopted for motive power. After submitting drawings for the general arrangement to several manufacturers of foundry appliances, it became apparent that many modifications would be necessary as the work progressed.

Contracts were therefore given for the whole of the work to a Detroit firm, the Russel Wheel & Foundry Company, who had begun the manufacture of industrial railways and cars, and who were willing to design a crane that would suit the requirements.

Fig. 1 is a ground plan of the foundry and buildings containing industrial railway, and shows curves, turntables, crossings of railroad and location of supplies and flask house. All together, there are over three-quarters of a mile of industrial railroad.

Fig. 2 shows all tracks located above the ground, and also shows the location of the rails for the crane to travel upon. Flasks from the second story of the flask shed are run on cars to the end of the track, and are taken by the crane to the ground track. On the roof of the sand shed are tracks for dump cars which drop sand or fire clay into the space beneath. On the edge of the foundry roof are tracks for storage that curve into the weigh house. On one of these are stored cars, each of which contains three boxes of coke, and on the other track are stored

Fig 4.—Under View of Crane.

ORIGINAL METHODS FOR HANDLING MATERIALS AT MICHIGAN STOVE COMPANY'S WORKS.

where the exact amount of pig iron is weighed. By a swinging crane and a special lifting device a box of sprues is transferred to one end of the car and the cor-

rect weight put on, then a box containing the required amount of coke is placed on the other end of the car, the whole being one charge for a cupola. The car is then pushed on one of the gravity roads to one of the cupolas, and so on until the tracks between the scale and the cupolas are filled with loaded cars. When the contents of the cars are charged into the cupola, the cars from No. 1 cupola are by a friction winch run down the track on the old incline to the yard, but the empty cars from No. 2 cupola are sent by a gravity track to a storage track near the weigh house. The first car each day contains limestone, which is dumped on the platform near the cupola and shoveled in with each charge, about 40 pounds being used to each ton of iron. After that car is a car of wood for lighting the fire, then three cars of coke for the bed; after this each car contains 1300 pounds of pig iron mixed as ordered, 700 pounds of sprues and 230 pounds of coke. When the last car containing a charge of iron is unloaded cars containing iron from the dump and gangway sweepings are charged.

Fig. 3 is a general rear view, showing in the distance a rope drive 400 feet long transmitting 75 horse-power. This was formerly exposed to the weather, but gives much better satisfaction since it is covered by a roof. This figure shows a general view of the crane, which is an ordinary bridge, without a floor, provided with lateral trusses to allow the cab which contains the hoisting machinery to run on the lower chords. The bottom of the cab is of plate glass, enabling the operator to see everything in the yard beneath him. In the cab are three controllers for operating the crane. The motor for moving the bridge is located at one end and the torsion of the shaft allows the other end to lag a little behind. When the crane can be spared the motor will be moved to the center so that the travel of both ends may be the same. The length of the crane is 90 feet from one track to the other. Its capacity is 3 tons, the length of wheel base is 14 feet, the speed of hoist is 50 feet per minute, of cab 100 feet, and of bridge 130 feet. The motor for hoisting is 6 horse-power, that for moving the cab 12 horse-power, and for moving the bridge 12 horse-power. The trestles for the bridge are pine; those on the foundry end are a part of the frame of the foundry and on the other side form the frame of the flask house.

Fig. 5.—Lowering Cars by Friction Winch.

Fig. 6.—Molder Making Record of His Castings.

ORIGINAL METHODS FOR HANDLING MATERIALS AT MICHIGAN STOVE COMPANY'S WORKS.

Fig. 4 is a view of the under side of the crane, taken from the roof of the flask house. It shows the cab running on the lower chords of the bridge. It also shows all the bracing of the bridge. A car containing 1300 pounds of pig iron is being hoisted to the weigh house, which is on the foundry roof, directly in front. On the right of the weigh house is the storage track for coke, which curves into the weigh house, and on the left is the storage track for sprues. Just in front of this and a little below it is the storage track for empty cars that have been sent out from No. 2 cupola. The crane in returning from a load can take back two empty cars. Beneath this track is the old incline for wheeling to No. 1 cupola, which is now occupied by an inclined track from No. 1 cupola, down which cars are lowered by a friction winch near the cupola. On the ground below this track is a storage track. Below the crane and leading from the entrance to the foundry floor is the track to the flask house, and on the right is a storage track on which are stored cupola cinders and sprues. The scale in the weigh house is balanced with an empty car standing on it. The first beam weighs 1000 pounds, the second beam weighs 355 pounds, the two weighing the 1300 pounds of pig iron, the 55 being for the side boards. The next beam is set for 800 pounds, which weighs 700 pounds of sprues, 30 pounds of sand and 70 pounds for the box. The next beam is set for 300 pounds, 230 being coke and 70 pounds the box. The next beam is set at 810 pounds, 600 pounds of coke and 210 pounds for three boxes. The other beam is set at 540 pounds, 400 pounds of coke and 140 pounds for the two boxes. These last two beams are for making up the bed of coke. All beams are in a locked box. The ones needed are pulled out and the load is varied until the beam tips.

A car containing 1300 pounds of pig iron is brought up by the crane and the weight made correct. A swing crane over the scale lifts a box of sprues and swings it to one end of the car. This crane is fitted with roller bearings and a single motion of a cam lifts the box enough to swing clear of both cars. When the sprues are weighed the crane swings over and gets a box of coke. When the charge is complete a tally peg is moved down one hole on a tally board. When charging the cupola, the cars pass it in the position most convenient to the melter. It was at first intended to dump the box of coke and the box of sprues directly into the cupola, but fearing that the materials would not be distributed uniformly the boxes are dumped on the floor and thrown uniformly over the whole surface with a fork.

Fig. 5 shows eight cars being lowered down the incline to the yard by a friction winch. On the right are seen charges of iron weighed out and piled, enough for one day's melt. These are stored on each cupola platform, to be used if anything should get out of order. The sprues and coke and pig iron could be wheeled up the old incline in such a case if it were necessary. For unloading a car of sand there are three trucks, each having two wheels and a caster. There are three boxes, which will each hold about 1500 pounds of sand, and which have drop bottoms dumped with a lever. A truck and one of these boxes are run into each end of the car and two men shovel sand into each box. The third truck stands outside the car on a platform, and the crane lowers the third empty box on it just as two men roll a filled box out on the platform. They hook onto the

full box and the crane lifts it onto the roof track, while the men roll the empty into the car for another load. The box is loaded on to a car on the roof, which is run by a man to one of the openings in the roof, where the bottom is dropped and the car brought back. To unload a car of sand with wheelbarrows takes three hours for six men, while six men with the crane will unload it in one and a quarter hours. Fire clay is unloaded in the same way, and is dumped into an overhead bin holding two carloads. This bin has in its bottom a hopper with a slide, through which the ground fire clay falls directly into the kettle, where it is mixed for cupola daubing. Iron trays with trips operated by the man in the cab were arranged to unload iron and coke from cars, but the crane is so occupied with hoisting cars to the weigh house that iron and coke are unloaded by contract by wheelbarrow.

Mixing the Pig Iron.—No scrap iron is used, and the mixture is No. 1 soft, No. 2 foundry, No. 4 foundry and a silvery iron varied in proportions to keep the quality uniform. There are three sets of piles containing these four irons. Each grade of pig iron is placed in a pile 9 feet wide and 50 feet long. A car can be placed centrally on the top of any one of these three sets of piles and with very few steps the loader can take the required number of pigs of each kind of iron and pile them at the central part of the car. The product has been more uniform since mixing iron in this way than when left to the caprice of a melter. The total weight of pig iron and of coke is accurate, and there is, therefore, no discrepancy between weights of material purchased and of castings produced. The remelt is also acurately weighed and the ratio of fuel to iron is accurate. By placing one complete charge on each car and keeping tally with pegs at weigh house and at cupolas no mistakes can be made. At present we have No. 1 cupola lined to 68 inches, and No. 2 cupola lined to 62 inches, and both are driven by a single No. 7 Roots blower, which has been used 18 years. This blower when new was rated to melt 14 tons per hour, but the two cupolas now melt 20 tons per hour with the single blower. We have purchased a new Roots blower of a capacity that will melt 30 tons per hour, which will deliver the iron as fast as the men can carry it away, and will give a continuous stream.

Recovery of Iron from the Cupola Cinders.—When all these devices were in working order it was found that the picking over of the cupola bottom and separating unburned coke and large pieces of iron, and taking cinder to and running it through the cinder mill and back to the weigh house, took more time and power than any other operation connected with the cupolas, and to save this the following plan was adopted: After the last iron has been drawn from the cupola at night the breast is knocked in and the slag runs out on the floor, a dam of sand keeping it from spreading. Iron that comes out with the slag forms a thin slab on the ground, which can be separated when cold, so that not a particle of iron will be lost. When the bottom is dropped it is composed of unburned coke, unmelted pigs and small pieces of iron, much of which has run into the coke, and some bits of slag and iron mixed, but nothing is cemented together, because the slag has been drawn off. In the morning the pieces of sand botto more picked out. The rest is quickly shoveled into cars and run out on the central yard storage track. The sculls from ladles are thrown into the same cars, as there is considerable iron adhering to them. These cars are stored during the day on the central storage track, and follow the car containing the last cupola charge, and the contents are dumped on the cupola platform. The chargers have nothing to do for an hour after the last charge is on, and they with forks carelessly shovel to one side unburned coke, and to another place iron and cinder, and to another place unmelted pigs or iron. The cinder and small particles of iron and iron from gangway sweepings are thrown on the last charge. Then the fine material that could not be taken up with the fork is riddled and that which is retained in the riddle is thrown in the cupola. The pig iron that drops with the bottom must be charged next day with enough unburned coke to melt and the rest of the unburned coke can be used as the melter chooses. Both iron and coke having been weighed the previous day, should not be weighed again. Iron borings or other fine scrap can be put on the last charge before any of the cinder is charged. As soon as the cinder is in the cupola the iron at the tap hole is perceptibly hotter; the cinder being wet, acts like the covering over a blacksmith's fire, the blast being held down, and every particle of iron and slag is melted out and a cover of hot fine coke is left. The iron and slag are drawn out when the breast is knocked in. This fine coke is returned each day to the charging door and the melter has quite a quantity to use when he thinks a little extra is needed. This dispenses with all cinder mills, power and repairs, and labor connected with them, and saves all the fine coke and iron that was formerly carted away as mill cinder. It saves every particle of iron from every quarter and prevents material blowing out of the cupola during the last of the heat and lodging on the foundry roof. It costs nothing to sort the bottom after the last charge is on, whereas sorting in the morning must be paid for.

We also contemplate enlarging the tap hole so that all iron and slag will run out of the same hole, the slag to be skimmed from the iron and conducted through a side spout to a wheelbarrow, which will be taken away as fast as it is full.

Molder's Desk.—Fig. 6 is a view of a molder's folding desk. Two other desks are closed. The method of keeping the molders' piece account is peculiar. Each molder has one of these folding desks in which is placed a sheet on which is written the name of each piece that the molder has on his floor, the number he is to make each day, and if it does not run steady the total number to be made. When a molder has shaken out his work he makes separate piles of each kind of castings and marks with chalk on the top of each pile the number of perfect cast-

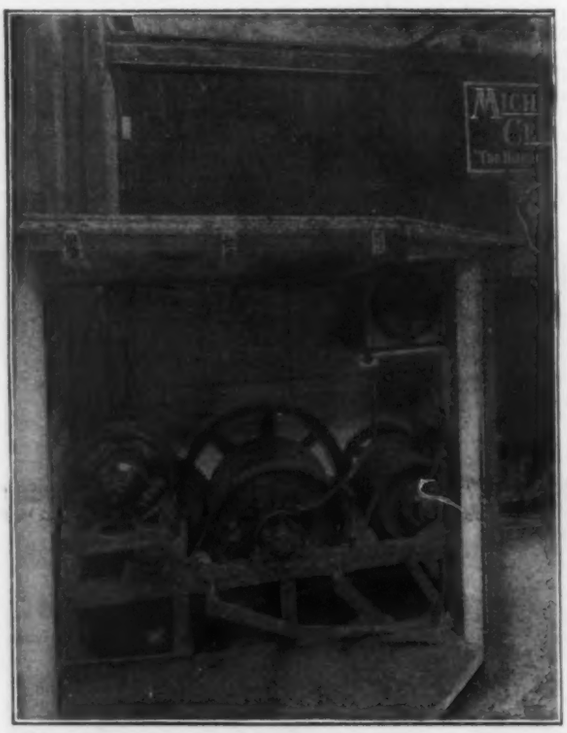


Fig. 7.—Electric Winch for Shifting Railroad Cars.

ORIGINAL METHODS FOR HANDLING MATERIALS AT MICHIGAN STOVE COMPANY'S WORKS.

ings. He also marks on his slip the same number. In the morning the castings are wheeled to the cleaning room by contract, and a clerk goes down each gangway immediately ahead of the wheelers and compares the numbers on the slip and on the pile and counts each piece and examines closely enough to see if the piece is recorded correctly. He then carries with him the slip, which, when he has collected a sufficient number, he sends to the timekeepers' office, when the account is transferred to the regular books. This is completed about 10 a.m., when the books and slips are taken to the discount room, and all discount is entered by marks on the slips and also on the book. The slips are then placed again in the molder's desk, when he can see what discount he has, and from 12 to 2 can inspect it, but cannot take it from the room. If there is any piece that can be made good or should not have been discounted, the molder can place it on a table and call the foreman's attention, who can allow it to be fixed. Each molder is furnished with a stamp containing his check number, with which he stamps each mold. In this way each casting contains the molder's number and no mistake can be made in discounting. In figuring up a pay the molder's account is figured separately on the slip and on the book, which checks all operations, and there are never any disputes regarding mistakes in counts. The molder knows exactly what he is earning each day. On each side of the discount room are bins, each holding the discount of three floor molders. At the center of the room are smaller bins holding the work of three snap molders. This discount is loaded on cars at 2 p.m. and taken to the weigh house. We have a machine for pulling nails, which will pull 75 a minute. At the end of this machine is a trip hammer, under which

the nails are placed to be straightened. It costs to pull, brighten in a tumbler, straighten and assort nails 50c. per keg, and they are as good for the molders as new nails. All nails are taken from old bars and the bars are then used over again, making a great saving in nails and lumber.

Fig. 7 shows a winch for moving steam cars on the main railroad track. At the other end of the track is a sheave around which runs a ⅝-inch steel wire cable, each end of which is wound around one of the drums of the winch. One of the drums runs at twice the speed of the other, and one drum is free to unwind as the other winds the cable. At one point in the cable there is a link into which is hooked the end of a chain, the other end of which is attached to a car. An electric signal tells which rope to wind and when to stop. The motor of the winch is 8 horse-power and will move on the straight track several cars. It takes one man at the coupling and one man at the winch to move a car or to make up a train. This same winch will be used at a future time to run some kind of coal conveyor to a receiving bin over the boilers, which are already fitted with Murphy smokeless furnaces, which have hoppers for self feeding from this storage bin, but thus far no satisfactory conveyor has been found. Having electricity, all parts of the works are lighted, saving over $50 each month during a good part of the year in gas bills. The cost of the apparatus described was about $16,000, which included electric generators and the flask building. We were not able to unload material from steam cars as we had calculated, and the 60 cars which were purchased were all needed in handling cupola material and flasks. Therefore the tracks and cars have not been used to take castings from the foundry to the cleaning room, and for this reason one-half of the tracks are not yet used. We expect to construct a cross between a car and a wheelbarrow by which one man can take half a ton or a ton of plate on the tracks to the cleaning room as quickly as he can now wheel 500 pounds, in which case we would expect to do such work at night, so as to have all gangways cleared and cleaning mills loaded at night. For various reasons we have not saved half the labor that we anticipated, and we expect to do much better in time. As it is, the saving is such that after setting aside $1000 each year for interest on the investment, we shall pay for the whole investment in three years with the present saving.

The Amalgamated Association Scale.

The most important matter before the Amalgamated Association at Detroit was the arranging of the boiling scale, and this has been done on the basis of $5 a ton for boiling on a 1.3 cent card, with 25 cents a ton advance for every advance of one-tenth of a cent in the card rate. The present scale is based on $4 a ton, so that the puddlers have asked a clean advance of 25 per cent. The old scale was one-eighth of the straight price for boiling. This has also been advaneed in the new scale, and muck rollers asked one-seventh of the straight price for puddling. With puddling at $4 a ton, the muck roller got 50 cents, while at $5 a ton he will get a fraction over 70 cents. The boiling scale, as adopted at Detroit in full, is as follows:

Boiling.—Base rate, $5 a ton, with bar iron at 1.3 cents; $5.25, with bar iron at 1.4 cents; $5.50, with bar iron at 1.5 cents; $5.75, with bar iron at 1.6 cents, and $6, with bar iron at 1.7 cents.

1. The charge for boiling furnaces shall be as follows: Single furnaces, not more than 550 pounds per heat; double furnaces, not more than 1100 pounds per heat; Siemens furnaces, not more than 1500 pounds per heat; double furnaces, not more than 2200 pounds per heat, and it is understood that two weeks' work shall be averaged.

2. In order to insure uniformity of iron in boiling furnaces and avoid the increasing customs of running in strong for common iron, thus increasing the hours and work of the boiler, the limit of time for each heat shall be as follows: For a single furnace, 1 hour and 45 minutes; for a double furnace, 1 hour and 50 minutes; for Siemens furnace, 1 hour and 55 minutes, and for a double furnace, 2 hours. The time shall be reckoned from the time the door is dropped after charging until the heat is ready to draw, and accidents and unavoidable detentions are not to be reckoned in. When a majority of the furnaces in any mill require more than the time specified to make their heats, due notice shall be given the boss, in accordance with Article 10 of the constitution. By the word majority is meant a majority of the furnaces working hard iron. Inferior coal, which increases the working time beyond that specified above, shall be considered a grievance.

3. One dollar per ton extra for dephosphorized iron.

4. Where Bessemer pig iron is worked alone, $1 per ton extra shall be paid.

5. One dollar per ton extra for all castings and runners over 75 pounds in one piece, and for all scrap pig metal, 25 pounds and under when worked alone.

6. One dollar per ton extra for hot ore fix.

7. For cast iron swarth worked on cinder bottom the price per ton shall be the same as boiling.

8. For half wrought iron turnings and half cast iron swarth worked on cinder bottom the price to be seven-eighths the price of boiling.

9. For wrought iron turnings, worked on cinder bottom, $2.60 per ton; the price for working turnings to advance and decline in the same proportion as the boilers' scale.

10. Busheling on cinder bottom to be one-half the price paid per ton for boiling.

11. Fifty cents per ton extra for all metal boiled, also for swarth and turnings worked on hot cinder fix.

12. For all light scrap worked alone in a boiling furnace the same price shall be paid as that for working wrought iron turnings; this to cover hoop No. 19 and lighter, wire No. 5 and lighter, sheet, and what is known as Norway scrap; this scrap to be cut from 8 to 10 inches in length for charging.

13. That the puddlers and boilers be paid for all blooms and sliders equivalent to 490 pounds where the charge is 500 pounds per heat, when it is no fault of the boiler.

14. Where pot metal or stove plate is worked alone, or mixed, 50 cents per ton extra shall be paid, but if stove plate or pot metal to the extent of 100 pounds or less is worked with pig metal no extra shall be paid.

15. When mixed material is worked, which is not provided for by the scale, the mean price between the prices of the material used shall be made the proportion not to go below one-third; this not to apply when worked with metal.

16. Five heats shall constitute a day's work on double turn, six heats single turn, and in mills working three turns five heats per turn shall constitute a day's work.

17. Pipe scrap over 4 inches in diameter, and heavy boiler plate shall be cut from 4 to 6 inches in length before charging.

Knobbling.—For knobbling a straight advance of 25 per cent. is provided for. The new rates on scrap per ton, 2464 pounds, the rate based on actual sales of bar iron, are as follows: One cent bar iron, $4.79; 1.1 cent, $4.92; 1.2 cent, $5.05; 1.3 cent, $5.14; 1.5 cent, $5.23; 1.5 cent, $5.33; 1.6 cent, $5.43. On refined iron per ton, 2464 pounds, the same 25 per cent. advance is demanded and the lists, based on the one-tenth cent bar iron price gradations, are as follows: Six dollars and 18 cents, $6.30, $6.59, $6.75, $6.38, $6.98 and $7.10.

Muck Rolling.—1. The price per ton of 2240 pounds to be paid for muck rolling on trains of two parts or sets of rolls or less shall be one-seventh the base price for boiling, but the roller to pay all labor in taking iron from squeezer and delivering upon bank straightened, except bloom boy. In such case where a bloom boy is used the manufacturers hereby agree to pay one-half the wages paid to said bloom boy.

2. For doubling muck iron on two high muck rolls the roller shall receive 17 cents per ton extra above scale prices.

3. When billets, 1½ inches or less, are rolled on a two high muck mill, any extra help required by the roller shall be paid by the company.

4. In no case shall any deduction of weight be taken from the roller on account of overweight by the boilers. He shall be paid full weight for all iron that passes through the rolls.

5. On mills averaging less than 16 tons per turn in two weeks the company shall pay the dragouts.

6. All companies to pay muck mill roller and crew $1.25 per man for changing rolls, provided it takes more than one and one-half hours to change rolls.

The scale now in force for rolling on muck mills calls for 56¼ cents a ton, based on a bar iron rate of 1 cent, and it is provided that wages shall be one-eighth the price of puddling when the puddling rate reaches $4.50 or more. It will be seen that the muck rolling rate in the new scale calls for a straight price of one-seventh the price paid for puddling, or boiling, as it is called in the amalgamated scales.

John Williams, secretary of the Amalgamated Association, has received a communication from James Nutt, secretary of the Manufacturers' Association of Youngstown, stating that the manufacturers of the latter organization will send a Conference Committee to Detroit to meet the committee of the Amalgamated Association, and settle the iron scales for the year at any time the officials of the latter may designate. It is probable that a conference will be held between a committee from the Manufacturers' Association and also a committee from the American Tin Plate Association and the Amalgamated Association just as soon as the business sessions of the latter have been concluded.

Suggested Improvements in the Manufacture of Bar Iron.*

BY SAMUEL PETERS.

Soft steel or ingot iron has for many purposes and to a large extent replaced ordinary wrought or weld iron during recent years. Notwithstanding this, there is a demand for good wrought iron produced by methods analagous to the puddling process which give a practically carbonless iron, and which is best defined as weld iron to distinguish the product from that obtained in the form of ingot. This definition will be recognized as one that was advanced about the year 1876 and one that is in use chiefly on the Continent of Europe.

I believe that all will agree that there is a genuine demand for weld iron, as shown by a frequent perusal of the iron trade papers. Until within a few years very much weld iron has been produced by reworking scrap wrought iron. The quantity so produced is now much less on account of the difficulty in obtaining wrought scrap unmixed with soft steel. On this account, and on account of the ever growing demand for cheapening product and at the same time improving the quality, any method that will economically produce these desirable results is worthy of attention.

The bulk of the new iron is produced in this country in the puddling furnace, and, roughly speaking, the method, as well known, consists in oxidizing the silicon, carbon, sulphur and phosphorus.

The iron given to the puddler may and frequently does vary much in composition, so that to make sure of good results a large excess of iron ore and iron cinder is used. This excess is chiefly obtained from the oxide of iron lining the boshes, and which keeps the cinder added and formed in the reactions basic in character. This variation in the composition of the pig iron demands skill and experience on the part of the puddler to produce good results, his chief guides being the relative fusibility of the iron, the kind of cinder produced and the nature of the reactions occurring in the furnace. Irons high in silicon, say, 2.5 to 3 per cent., and high in phosphorus, say, 1.5 per cent., are difficult to deal with by this process. Theoretically this should not be a difficult matter, for if the composition was known the cinder added could be chosen, and one low in silica used. That this can be done I can vouch for by an experience I once had with a high silicon and high phosphorus pig iron. The pig was melted along with rich iron scales, containing practically no silica. As soon as the iron and scales were melted the liquid bath was rabbled for a very short time, and the cinder was at once run off. When this was done a lot of iron cinder containing considerable silica (and which had been previously piled on the ore lining in a large bunch, so as to prevent much of it melting) was pulled into the bath and melted, and the heat finished with this cinder slightly acid in character. The results were very good indeed. If rich iron scale containing no silica is used entirely, and with a low silicon pig, the cinder retained by the iron will be so basic as to fuse with difficulty on reheating the muck bar and produce a hot short or slag short iron.

The quantity of cinder employed is important, as will readily be seen from a chemist's standpoint. It is also quite as important from a physical standpoint. If too much cinder be present the early stage of the operation is retarded because the large quantity of cinder hinders the iron from obtaining the necessary heat from the flame. This, however, rarely happens. If too little cinder is present the dilution of the impurities conveyed from the pig to the cinder is insufficient, so that a more impure cinder will in that case be carried into the puddled ball. Again, too little cinder present will retard the refining, and hence the welding of the granules as they are formed or when the iron is dropping. At that time the cinder is collecting on the bottom of the furnace, and is still needed to further decarbonize a portion of the iron not then wholly refined. In practice with the ordinary puddling furnace it is found as a general rule, when working gray forge iron, that 500 to 600 pounds of iron ore are required per ton of muck bar, although in many cases the amount of ore will run up to 1000 pounds per ton of finished muck bar, exclusive of taps and of squeezer cinder added. From a consideration of the foregoing would it not be well if a more scientific method of dealing with the materials at command could be used? Attempts have been made in this direction, as witness the following brief description of a method once used, although not in use now so far as I am aware:

A good brand of mill pig iron was melted in a cupola, then transferred to an acid Bessemer converter, and there blown until the silicon had disappeared and the carbon was reduced to a comparatively small percentage. The melted metal was then transferred to a properly heated balling furnace, or to a Danks rotary furnace lined with iron ore, and there further treated until the metal dropped or came to nature. The resulting ball or bloom was squeezed or hammered and rolled into muck bar. The product thus made, I was told, was excellent in quality under cold test. Why the method is not in use now I do not know, unless it is that the metal produced cost too much, or was red short; one would expect it to be the latter judging from the character of the lining of the furnace

It would seem to the writer that the following method will accomplish the results already pointed out as desirable. The method here proposed is not in use so far as I am aware. Melt the pig metal to be treated in a cupola, then transfer it to an acid Bessemer converter, and when desiliconized and mostly decarbonized by the usual means, transfer the liquid metal to a properly heated rotary furnace lined with bauxite or magnesite, either in the form of brick or as a monolithic lining. The carbon and phosphorus present, it is proposed, shall be removed by the use of an oxide of iron slag approximately containing 10 to 15 per cent. of silica, and with the exception of a few per cent. of lime, oxide of manganese, &c., the balance to be oxide of iron. It will be necessary:

1. To supply sufficient slag bearing oxide of iron to complete the oxidation of the metalloids and to give a base to combine with the phosphoric acid formed.

2. To supply a slag that shall not be too liquid at the temperature employed in the rotary furnace and yet not too pasty at that temperature.

3. To have the percentage of silica so low on the one hand that the slag may be basic in respect to phosphorus, and yet on the other hand sufficiently acid to have the oxidation of the phosphorus effected comparatively slowly, and also to avoid the presence of very basic slag in the resulting ball, which would in the latter case almost surely yield a hot short product. A slag sufficiently acid containing, say, 15 per cent. silica is a good one, and also for the further working of the iron in the reheating furnace. For the reason given above a lining of bauxite or magnesite (both being very infusible) will be preferable to oxide of iron, the latter making the cinder too basic. The lining may be made in one piece by ramming into place calcined and crushed bauxite or magnesite mixed with a sufficient amount of a neutral iron slag, so that upon the application of a high heat the lining will glaze over the surface and the semifusion of the outer coat will assist in keeping the lining in its place. Or the lining of the furnace may be effected by using magnesite and bauxite bricks, but on account of the expense of magnesite brick doubtless bauxite will be preferred. As to the amount of slag necessary for the work required, if we have 100 pounds of desiliconized melted metal needing treatment containing, say, silicon, 0.05 per cent.; carbon, 0.5 per cent.; phosphorus, 0.5 per cent., and sulphur, 0.05 per cent., there would be required (neglecting the silicon and the sulphur) approximately 6.58 pounds magnetic oxide of iron (Fe_3O_4) for the reactions which theoretically would give 3.41 pounds of metallic iron and 3.01 pounds of ferric phosphate, which would mean a cinder composed entirely of iron phosphate. This would, of course, want dissolving in other iron bearing slag carrying an excess of oxide of iron to give the required bulk for protecting the iron from oxidation in the further working of the heat in the rotary furnace, and to dilute the phosphate of iron for after considerations. Judging from the following calculation 25 per cent. of the weight of the pig iron of cinder will probably be wanted. If we suppose that the composition of the cinder used was

	Per cent.
Silica	15.00
Protoxide of iron	36.00
Lime, oxide of manganese, &c.	5.00
Proto-sesquioxide of iron	44.00
Total	100.00

and 25 pounds is used per 100 pounds of metal treated, then we should have silica, 3.75 pounds; protoxide of iron, 9 pounds; lime, &c., 1.25 pounds; proto-sesquioxide of iron, 11 pounds, less 6.58 pounds used, 4.42 pounds, and added to cinder 1.14 pounds of phosphoric acid, and its quota of magnetic oxide of iron, 1.87 pounds, composing the slag. The composition would then be approximately:

	Per cent.		Per cent.
Silica	17.50		
Ferrous oxide	42.00	Iron	32.66
Lime, &c	5.60		
"Free" magnetic oxide of iron	20.60		
Phosphoric acid	5.30	Iron	21.44
Magnetic oxide iron	9.00		
		Total iron	54.10
Total	100.00		

Here the percentage of silica finally obtained is not too high, and the percentage of phosphoric acid is not too high to be unsafe. If a cinder containing a large amount of phosphoric acid be mixed and carried away with the balls of iron from the rotary furnace there is danger of a partial reduction of the phosphoric acid when the muck bars are highly treated in the finishing process. It may be, however, that 25 per cent. of the weight of pig of cinder will be insufficient to give the bulk required for the

* A Paper read before the Chemical Section of the Engineers' Society of Western Pa., on Thursday Evening, May 18, 1899.

purposes before mentioned. In such case more must be used.

In the above calculations as to cinder composition nothing is allowed for the wear of the bauxite or magnesite lining, which would make a slight difference in the composition of the slag.

The Composition of the Slag After Refining.

From the calculation given it will be seen that the slag can be used again by adding sufficient oxide of iron, Fe_3O_4, or roll scale to restore the necessary percentage of Fe_2O_3 for the oxidation of a fresh charge. It is well known that 15 per cent. silica gives a fluid cinder, and even more silica, say, to 19 per cent., is sufficiently basic to remove phosphorus in a basic process. Of course the cinder will have to be modified according to the percentage of phosphorus present in the pig iron. To render the cinder whose composition has been above calculated available for further use and for the treatment of a similar pig iron, the addition of 20 per cent. of Fe_3O_4 to the said cinder would give a mixture whose composition in per cent. would be:

	Per cent.
Silica	14.56
Protoxide iron	34.93
Lime, &c	4.85
Proto-sesquioxide of iron	41.25
P_2O_5	4.40
Total	99.99

It is questionable from this whether this cinder is sufficiently pure to use again with only a 20 per cent. addition of Fe_3O_4.

If metal can be delivered to the balling furnaces with a practically definite composition and the slag mixtures are regulated by weight and analysis we surely can expect to get more uniform results than by the old methods used for this character of material. I am aware that methods may look well from a theoretical standpoint and prove to be utterly worthless in practice, but I cannot but think the method outlined is feasible.

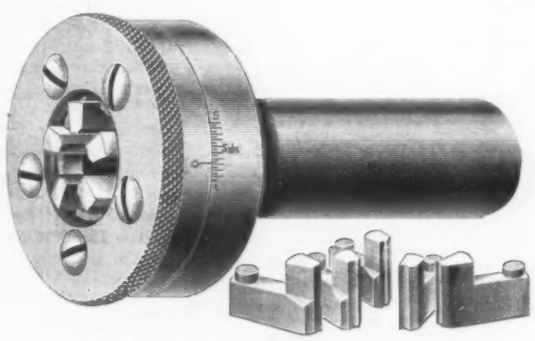
One of the chief advantages to be derived from producing iron in large masses is the greater economy obtained in fuel, repairs, labor, &c. For this reason, with a process as outlined able to handle large weights of material in one charge, we could by giving similar treatment to this material as that given to ingot metal obtain billets and slabs in lieu of muck bars, and on this account obtain solider and cleaner iron for all purposes. If large appliances are used to treat such material in large masses the reduction in area to a billet will be sufficient to make it unnecessary in many cases to resort to shearing and piling. The experience of iron manufacture goes to show that upon a ball produced in a puddling furnace and weighing, say, 150 pounds, there is insufficient work to produce a satisfactory billet directly from the puddled ball when treated in an ordinary squeezer and muck rolls. The billet so made is too rich in slag and oxide of iron to produce a finished rod or small round. For this reason the practice is to roll into flat bars, cut up and reroll into finished iron. Some years ago it will be remembered that the large balls made in the Danks rotary puddling furnaces, and whose weight was, I think, about 1000 pounds, were squeezed in a large horizontal squeezer and then wash-heated and, rolled into a wide and long muck bar. Similarly it seems to me that if the weight of the charge treated as outlined above is from 1000 to 1500 pounds, if a ball approximately of this weight be produced and if it be specially treated in a hydraulic squeezer, and if it be still further treated by wash-heating and then be rolled in a sufficiently large blooming mill to a billet 4 or 5 inches square, then the billet would be found to be sound. It would be free from patches of basic cinder on account of the large amount of work given and on account of the "controlled" quality of cinder carried from the furnace by the ball. Even if this were not realized still the product could be rolled into wide and long flat bars, and there would still be the advantage of handling much material in a short time, and so increasing the product, which means less consumption of fuel, &c.

Imports of Tin Plates.

The exports of tin plates from the United Kingdom to the United States during the month of April showed an increase of nearly 900 tons over those of March and were very nearly equal to the exports for April, 1898. The figures are as follows: April, 1899, 5181 tons; March, 1899, 4302 tons; April, 1898, 5221 tons. The total shipments of British tin plates to this country in the first four months of the current year have amounted to 15,717 tons, as compared with 30,261 tons in the corresponding period of last year; so that the amount of foreign plates imported this year so far has been but little more than one-half that brought in a year ago. The increase last month is attributable, in some measure, to purchases of Welsh plates made at the time when a scarcity of the American product was threatened and prices on this side were nearly on a parity with the price at which foreign plates could be laid down on the Atlantic seaboard. Since then the price of Welsh plates has advanced and the American mills are again making pretty free deliveries, so that the month of May is likely to show a falling off in the importation of the foreign product.

Adjustable Hollow Milling Tool.

The Geometric Drill Company of Westville, Conn., have perfected a line of adjustable hollow milling tools in the design of which they have aimed to combine durability and simplicity. The tool is made from solid bar steel and consists of only three parts, aside from the cutters and screws, being a cam, holder and ring. The holder is slotted in the front to receive the cutters, the reverse end of the holder forming the shank by which the tool is held. The cam is recessed on the inner side to receive the lugs on the cutters by which the adjustments are made for cutting larger or smaller diameters. The ring, acting in connection with the screws which pass from the cam through the holder to it, serves to hold the parts securely together. An index, graduated to read in hundredths of an inch, is provided at one side of the cam and holder for varying the diameters to be cut. The periphery of the cam is knurled on a portion of its width to facilitate the adjustments. The screws which pass from the cam through the holder to the ring serve to bind the parts of the tool together, and to make an adjustment from one diameter to another the screws should be loosened sufficiently to allow the cam to be turned, when the index may then be set at the desired point and the screws again tightened, which at once locks the cutters firmly. The makers recommend, as a quick and easy method of setting the



ADJUSTABLE HOLLOW MILLING TOOL.

cutters, the use of hardened steel sizing plugs of the correct diameters to be milled. A plug may be inserted in the mouth of the tool and the cutters set to it without regard to the index, this method being especially desirable for duplicating parts the diameters of which are required to be uniform. The cutters are made to project as far from the face of the cam as practicable, to adapt the tools for milling to a shoulder if required, and this form also makes the cutters very long lived, as it admits of repeated sharpening, the grinding of the cutters for sharpening being done only at the outer ends.

These tools are made in three sizes, ⅜, ¾ and 1¼ inches, and in either larger or smaller sizes for special work.

St. Louis Foundrymen.

A well attended meeting of the foundrymen of St. Louis was held recently at the St. Louis Manufacturers' Association for the purpose of forming the St. Louis Founders' Association. A constitution and by-laws was adopted and officers were elected as follows: George Q. Thornton, president; William T. Koken, vice-president, and John M. Harrison, secretary and treasurer.

The following named foundries were represented and signed the constitution: Ætna Iron Works, Carondelet Foundry Company, Christopher & Simpson Amalgamated Iron & Foundry Company, George J. Fritz Foundry & Machine Company, Gerst Bros.' Mfg. Company, Koken Iron Works, John C. Kupferle, Magnetite Foundry Company, Medart Patent Pulley Company, Pleuger & Henger Mfg. Company, St. Louis Car Wheel Company, St. Louis Iron & Machine Works, Shickle, Harrison & Howard Iron Company, South St. Louis Foundry Company, Union Iron & Foundry Company and Whitman Agricultural Company.

It is understood that several other foundry operators of this city have signified their intention of joining the association, which will then contain practically all the foundrymen of St. Louis.

The Wellman Open Hearth Furnace.

At the recent meeting of the Iron and Steel Institute Archibald P. Head read a paper entitled "Tilting Open Hearth Furnaces," in which he described the Campbell and the Wellman furnaces. We reproduce that part of the paper which refers to the latter, because it shows the type adopted for the new plant, at Ensley, of the Alabama Steel & Shipbuilding Company, where the Bertrand-Thiel process is to be adopted. The works in question, which are now under construction, are for the purpose of making blooms and rails from open hearth basic steel, the pig iron used being the phosphoric variety made in large quantities in and near Birmingham, Ala., from the cheap Southern ores. Up to this it has been taken for granted that ingot iron can be made more cheaply by the Bessemer than by the open hearth processes, and where the greater variability of the product of the former process is not of vital importance, as in the case of rails, the Bessemer process, acid or basic, has hitherto been used. Owing, however, to the improved appliances, which have of recent years been introduced in connection with the open hearth practice, especially in America, the difference in cost between the two processes has been steadily diminishing until now in the above mentioned steel works the open hearth process is about to invade the field hitherto considered to belong exclusively to the Bessemer process—viz., the manufacture of rails. Among the mechanical improvements and labor saving devices which have rendered this possible mechanical charging and the tilting furnace play an important part. The electric charging machine for open hearth furnaces was fully dealt with by the late Jeremiah Head, in a paper before this institute in May, 1897, and it is therefore unnecessary to dwell further on this.

The latest form of tilting furnace, as about to be installed at Ensley, Ala., embodies the result of all past experience. There will be ten such furnaces in a row, basic lined, each of 50 tons capacity. If working with acid linings, these would be rated as 55-ton furnaces.

Ports.—The gas and air ports are of novel construction, designed to minimize the leakage of cold air inward at the joint. The two passages leading from the regenerative chambers to the ports terminate in two

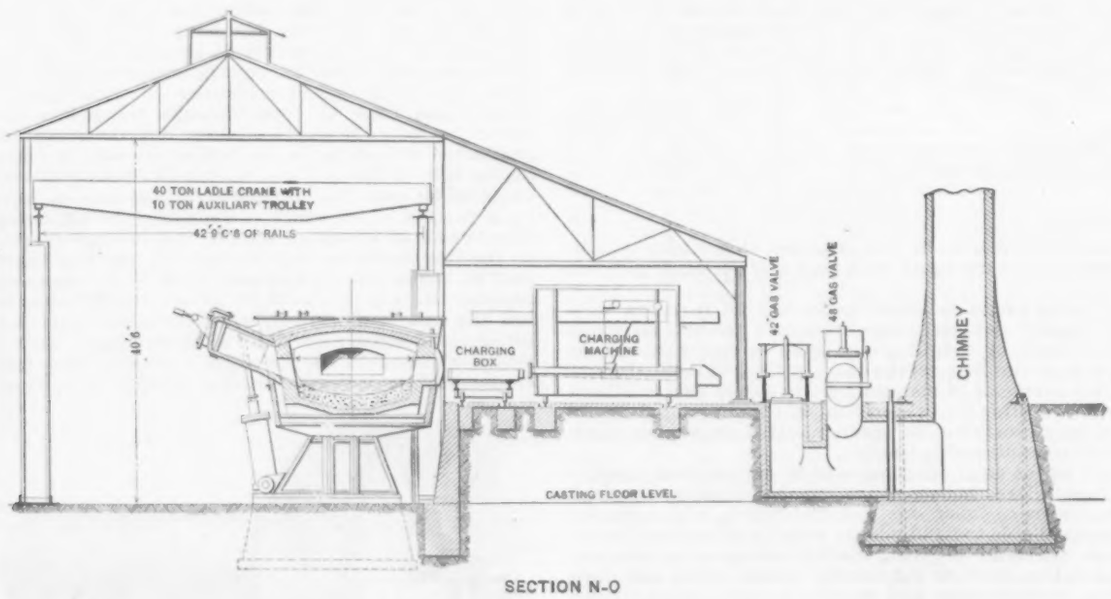


Fig. 1.—The Wellman Furnace in Normal Position.

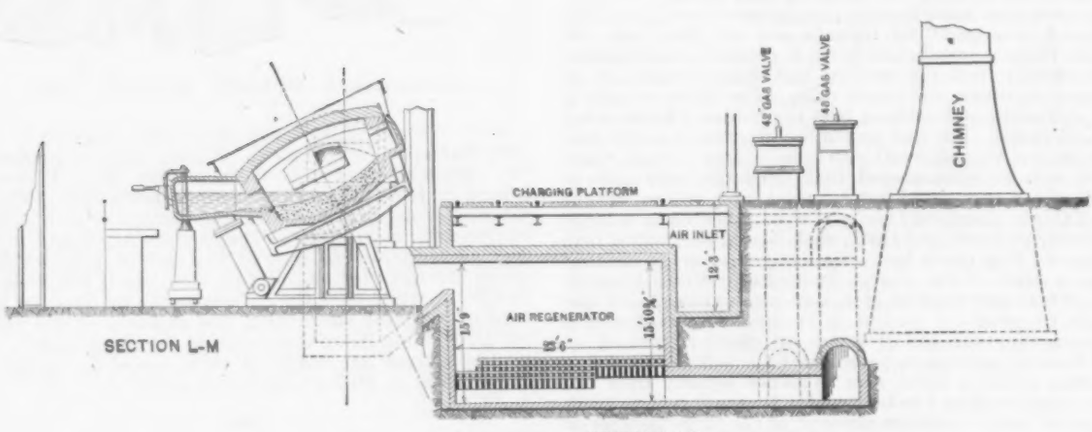


Fig. 2.—Pouring through Special Ladle Attached to Tapping Hole.

THE WELLMAN ROLLING OPEN HEARTH FURNACE.

water troughs, about on the level of the charging floor. As before, the brick work of the ports is inclosed in a metal cage. But instead of being fixed, it moves upon flanged wheels running upon rails, which enable it to be moved a few inches toward or from the furnace end. The water troughs are so designed as to allow this small motion without breaking the seal. When melting is in progress the ports are moved up to the furnace so that the face plates are in contact. When pouring is about to commence they are moved away so as to allow the furnace to tilt freely. The ports can be removed bodily for repairs.

Ladle.—It is intended that each furnace shall be provided with a casting ladle of a special design, being attached to the front of the tapping hole, and forming, in fact, part of the structure. The ladle is provided with two pouring holes and stoppers. When the furnace is tilted for pouring, the metal, with the layer of slag on

the top, flows into the ladle, and stands at the same level as in the furnace. Trains of casting bogies, each carrying two ingot molds, are, as is usual in America, brought under the pouring holes. As the distance apart of the latter is the same as that of the molds, two molds can

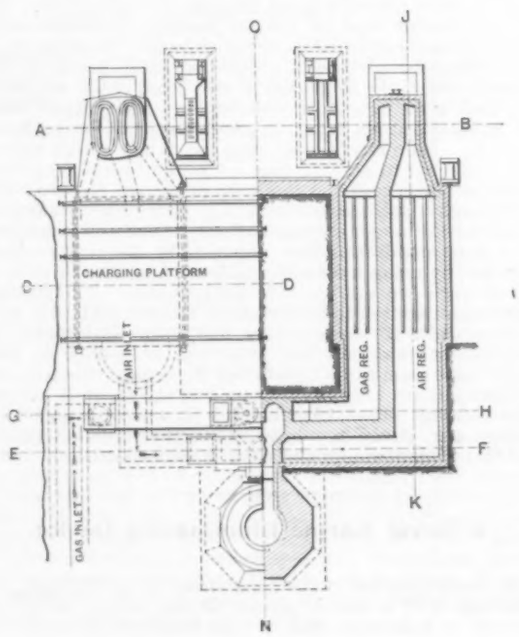


Fig. 3.—Plan and Horizontal Section.

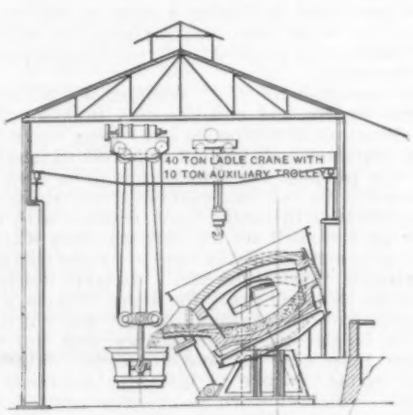


Fig. 4.—Pouring through Spout Into Ordinary Ladle.

into bottom cast molds, arranged elsewhere in the casting house.

Regenerative Chambers.—The regenerative chambers are arranged side by side in two pairs, one pair being at each end of the furnace, and extending under the charging platform. The portion of the charging platform in front of the furnace is upon solid ground, the valve standing above the level thereof, and being well out of the way at the back.

Body of Furnace.—In previous designs the body of the furnace has been round or oval in section, and inclosed in steel plates, somewhat after the manner of a boiler. It has been found, however, that this method of construction leaves something to be desired in point of strength. In the present case the furnace body is roughly rectangular in section. The whole furnace is inclosed in a strong cage, constructed of plates, channel and angle bars, while stout tie rods bind the two ends together. There are also diagonal tie rods across the top, binding together the front and back in such a manner as to prevent distortion and curvature. Indeed, the same mechanical principles that regulate the design of bridges and other structures, are observed here. The stress on each member is carefully calculated and allowed for.

Lining.—The furnace top, sides and the outer layer of the bottom are lined with silicated bricks. The inside or basic portion of the bottom is made with magnesite, which is burnt on in thin layers about 1 inch thick at steel melting heat. It is laid on with a large spoon, and smoothed down, and when heated to the furnace temperature adheres to the next layer. Subsequent repairs are made with dolomite.

Valves.—The air reversing valves are of the usual butterfly pattern, which, being always comparatively cool, do not give trouble by warping and consequent leakage. The gas reversing valves consist of two mushroom valves, machined on their beveled edges, and resting on circular seat, with sharp edges. Both valves and seats are internally water cooled. The water enters the valve by a tube inside the hollow stalk, by which it is raised and lowered, and leaves by the annular space. Such valves are free from leakage and are found to work satisfactorily. There is a chimney stack to each furnace.

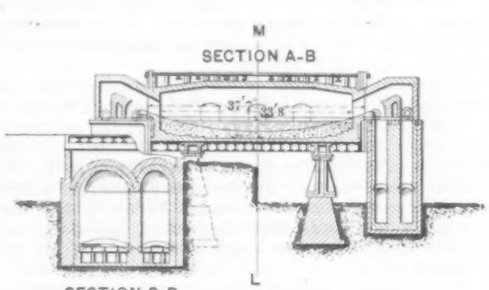


Fig. 5.—Longitudinal Section.

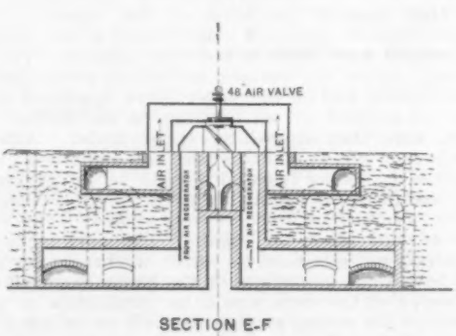


Fig. 6.—Section through Air Inlet Valves.

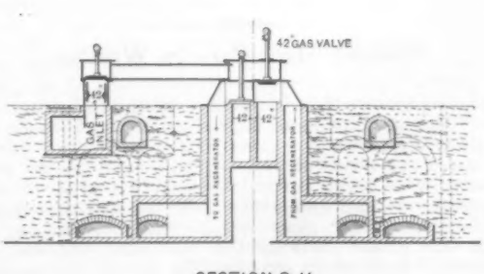


Fig. 7.—Section through Gas Inlet.

THE WELLMAN ROLLING OPEN HEARTH FURNACE.

be filled simultaneously. An alternative method of casting will be to pour the steel through the plain spout into an ordinary ladle, provided with pouring hole and stopper, and suspended from an overhead electric crane. When filled, the ladle will be raised sufficiently high to be poured either into the molds standing on bogies or

Furnace Doors.—The furnace charging doors are three in number, and are operated by pneumatic cylinders through wire ropes, the leads being arranged in such a way that the doors remain closed while the furnace is tilted. The doors are all 3 feet 6 inches broad by 3 feet high, which allows ample room for the insertion of the

boxes of the charging machine. There are also small doors 18 inches by 2 feet at each end.

Angle of Tilt.—The angle of tilt, which for pouring is 25 degrees with the horizontal, is regulated by stops, which come in contact with the upper covers of the hydraulic cylinders when the extreme angle has been reached. By a simple mechanism, these stops can be thrown out of gear and a further tilt permitted when it is desired to drain off all the slag.

Advantages of the Tilting Furnace.—The advantages of the tilting over the fixed furnace may be summarized as follows:

1. The slag, which, especially in the basic process, is somewhat abundant and troublesome, can be poured off at intervals during the melting process. If allowed to remain, it forms a more or less non-conducting covering to the bath, preventing the access of heat.

2. As the pouring hole of the furnace is above the level of the bath in the normal position, it is never closed up, but only loosely covered to exclude the air. Consequently the time taken to open the hole before pouring, and to repair and close it after pouring, which sometimes amounts to one hour in an ordinary fixed furnace, is saved, as well as the labor connected therewith. The moment after the furnace is emptied the charging of materials can begin.

3. Since no injury is done to the pouring hole by opening and cleaning, the life of the furnace bottom is much prolonged. The occasional trimming required by the hole can be done at any convenient time.

4. The cold air, which enters at the end ports when the furnace is tilted, is an advantage, in that it chills the layer of slag left on the surface of metal, which is as effectually prevented from boiling and spurting as if it were in a ladle.

5. In every fixed furnace small inequalities in the bed must exist, in which pools of metal lodge, and can with difficulty be removed. This leads not only to a waste of metal, but to a diminution of the capacity and often to a distortion of the furnace bottom. In the tilting furnace, every particle of metal and slag can be removed after each charge. A saving of metal of at least 2 per cent. has been effected by the tilting furnace, as compared with the fixed furnace, which is ascribed to this cause.

6. The tapping of the charge can take place at the exact moment when the metal is of the desired composition. As no opening of the tapping hole is required, no time need be lost in that operation. The advantage of this is specially felt when steel of exact composition is required for special purposes.

7. In case of any hitch or accident during pouring, the furnace can be instantly tilted back and pouring cease.

8. The tilting furnace lends itself readily to the transfer of metal from an acid to a basic furnace, or *vice versa*, as is practiced at the Pennsylvania Steel Works.

9. The whole body of the furnace is easy of access for repairs or examination. Should a break out occur, the regenerative chambers will not suffer, not being underneath the body, as is the case in the older form of Siemens furnace.

10. The furnace bodies do not become deformed, as in the case of fixed furnaces, since as structures they are much stronger.

The objections to the rolling furnace are as follows:

1. It is somewhat more expensive than the fixed furnace.

2. The inlet of cold air during pouring tends to oxidize the manganese, which must be made up for by further additions in the molds.

Pressed Steel Cars in Wrecks.

The Baltimore & Ohio sends out the following report from Thomas Anderson, master car builder of the Pittsburgh & Western:

One of our trains of Schoen steel cars, 100,000 pounds capacity, was going up an 80 to 90 foot grade when ten cars broke off and ran away from the rear part about 90 car lengths. Four more of the steel hoppers ran back down this grade, striking the rear part and damaging Pittsburgh & Western steel car No. 4001 to the extent of two center sills badly damaged and buckled so much that it was necessary to cut them off and have the bent parts straightened and replaced by riveting on a plate both inside and outside of the channel. It required a new end sill, but the old end sill removed was in shape to be used in repairs to other cars, as we straightened and plated the fractured part so as to have it ready for other damaged cars. The material required amounted to $12.70. The labor amounted to $27.60, making a total of $40.30 to put car in good first-class condition.

Steel car No. 4351 was in accident on the Baltimore & Ohio, and was sent home for repairs, having end sill, side sill, corner post and stake badly damaged. We made the necessary repairs very easily, and put the car in first class condition by using one end sill, one corner post and one side stake, and straightening out the side sill by building a fire under it and using hydraulic pressure for straightening it out. The material used on this car amounted to $10.40 and for labor $28, making a total of $38.40.

Steel car No. 4211 left the track at Negley Stone track, which is about 10 to 15 feet higher than our main line. The car went over the bank, landing on main track. This car was under load of 100,000 pounds of crushed stone. The sides were crushed in about 18 inches, bending all the side stakes on each side of the car and breaking four journal boxes, one brake shaft, two hand holds, one winding shaft bent, drop door attachments bent, brake levers and guides torn off, truck channel bent and brake beams torn off. The pressed steel diamond truck under this car was subjected to a great deal of rough usage in getting main track cleared, and the body of the car received some very rough handling to avoid delay to trains. I supposed that I would have to remove all side stakes on account of their bent condition, but, fortunately, we made a first-class job by using hydraulic jacks and hammering on the stakes until we got the side straightened. The material required amounted to $8.37; labor, $30.60; total, $38.97.

If a train of wooden cars had been subjected to the punishment that car No. 4001 was subjected to there would have been nothing left but the scrap. In this case this car was the only car damaged in the train, it being so solid that all other cars behind it were protected. A wooden car would not have stood the punishment that No. 4211 went through under such heavy load.

A Novel Marine Illuminating Device.

A demonstration of the capabilities of the Wilson illuminating shell, a novel marine device, which took place recently in Baltimore, Md., is thus described in the *Herald* of that city:

The shell is an apparatus for lighting up the sea at night. It is in the shape of an ordinary projectile, and may be thrown from a gun in the direction of an enemy or dropped overboard alongside a ship, as the occasion may require. It is buoyant, and, striking the water, becomes an illuminating plant of itself, shedding a powerful light over the water.

It is the invention of Col. William J. Wilson, the acetylene gas expert, and consists of a hollow cylinder, made from drawn steel tubing, in sizes from 3 to 6 inches or more in diameter and from 3 to 5 feet in length, according to the purpose for which it is to be used. The shell is loaded with calcium carbide, from which acetylene gas is generated instantly upon contact with water. At one end of the shell are the burners, from which the gas escapes as generated and is lighted by electricity generated by a battery within the shell. It takes less than 30 seconds to make the shell ready for firing from a gun or throwing overboard. On falling into the water it floats a quarter of its length above the surface, and the water, entering small holes near the base, comes in contact with the calcium carbide, which is instantly converted into acetylene gas, which in turn is at once ignited at the burners by the self generating electric current.

A large tank of water was used in connection with the experiment. No sooner was the big shell plunged into the water than it sank, then rose like a can buoy, righted itself, and from the burners at the top there shot a white flame that dazzled the eyes of the beholders. The clustered burners emitted a blaze, which at sea, on a dark night, would have been a powerful beacon. The shell was forced under the surface as though submerged by a powerful wave, and on the water there appeared a flame such as is created by oil burning on the surface. The burners were then from 3 to 4 inches under. Again the shell was sent below, and this time the light was entirely extinguished. Being released it came to the surface like a cork, and instantly the little electric plant in the shell fired the gas and the burners were ablaze. This experiment was tried again and again. The device cannot be permanently extinguished by water washing over it, and cannot be put out by natural or mechanical current of air. It is stated that the shell would be invaluable as an adjunct to the life saving service, as well as in naval warfare, and, in fact, for any service that requires illumination of the sea. The shell is being manufactured by the American Illuminating Shell Company, a Baltimore corporation.

The *Marine Review* of Cleveland, Ohio, says it is more than probable that negotiations now under way will result in the Wheeler shipyard at West Bay City, Mich., being purchased by the American Ship Building Company. Plans for a lease of the Union Dry Dock Company's plant at Buffalo are also progressing, so that it would seem that soon the Craig yard at Toledo, Ohio, will be the only works outside the consolidation on the Great Lakes.

The American Foundrymen's Association.

Report of the Third Annual Convention at Pittsburgh.

(CONCLUDED.)

Thursday morning's session opened with the reading of a paper by Prof. Albert W. Smith of the Case School of Applied Science, Cleveland, Ohio, as follows, entitled

"The Utility of Chemically Standardized Iron Samples."

The use of the chemical composition of pig iron as a basis for proper blending to produce any desired quality of casting, while the only accurate and scientific method, is beset at the start with grave difficulties, so serious, in fact, that to many I imagine they have appeared insurmountable.

The first theory governing such application was that a given chemical composition always produced the same quality of iron. As a matter of fact iron, and the elements with which it is associated in pig metal form many differing molecular compounds, so that ultimate chemical composition does not afford all the information necessary for our purpose. Carbon and iron possess the property, in common with many other carbon compounds, of forming a variety of substances possessing very different properties and still containing identical proportions of carbon. It was early learned that two irons may have identical ultimate chemical composition and still have the widest differing physical properties. Something more must be known than the chemical composition of the various grades of iron available in order to successfully make any desired casting from them.

HEAT TREATMENT.

The main circumstance that influences the manner of combination of these elements to form the various compounds possible is the character of their physical treatment, and especially their heat treatment. The soft gray iron may have just the same proportion of carbon as the hardest chilled white iron, so that we must amend our theory somewhat to this form: "Samples of iron having identical chemical composition and physical treatment will possess identical physical properties." In this form I believe all experience has shown the proposition to be absolutely correct and a safe guide in practice; but in its application numerous pitfalls must be avoided. Perhaps the difficulties most commonly encountered are two: 1. That the analysis sent by the iron manufacturer does not represent the average composition of the shipment, due to improper or careless sampling or loading, or that the analysis, made from a proper sample, was incorrect. 2. That the iron, in passing through the foundry smelter, undergoes a chemical change, losing silicon, and possibly gaining or losing other elements.

The latter of these causes of failure in the application of our theory depends for its removal wholly on the founder and his chemist. In almost all cases where iron is melted some change in chemical composition occurs, and the amount and kind of this change varies with the conditions of melting. The first requisite to success in applying the theory to foundry practice, then, is to study the nature and amount of those chemical changes which take place under the various conditions of smelting employed in the foundry under consideration. When these changes are once understood and their approximate quantity determined, allowance may be made for them in calculating the mixture to be employed.

CHEMICAL ASSISTANCE.

The first cause mentioned, that of inaccurate knowledge of chemical composition, needs for its complete removal the employment by the founders of competent and porperly trained chemical assistance. So long as entire dependency for a knowledge of the chemical composition of this stock is placed on the iron producer, trouble is always likely to occur. Not that iron makers would willingly send out erroneous analyses, but where there is no checking process on either loading, sampling or analysis carelessness in one or more of these is likely to follow. No matter how well intentioned the furnaceman may be, if it is known that his customer keeps no control over what he buys carelessness in loading a shipment, in sampling or analysis is apt to creep in, because employees intrusted with these details are often not so interested in accuracy as they should be, and soon learn where they can be careless without detection. On the other hand, if it is known that every shipment, upon its arrival at the foundry, will be properly sampled and analyzed by a man whose results are most liable to be always correct, the material as it arrives at the foundry will seldom be other than as contracted for. In the case of small foundries, where the expense of a chemist's salary could not be afforded, combination could be resorted to in this one item

At some works the practice exists of keeping record of the total expense of maintaining a laboratory, and this sum total is divided by the whole number of analyses made during this time, the quotient, or cost per determination, being apparently taken as an index of the efficiency of the laboratory! An equally sensible analogy would be to value the services of our physician by the average cost per pill administered regardless of results. I am informed that in some cases this efficiency index has been squeezed down as low as 15 cents for a single determination. A chemist in such employ, recognizing the fact that he must keep this cost per determination low to please his superiors, exerts himself to the utmost to swell the number of analyses made, and no doubt grinds them out as best he can under such influences, but with how much regard for accuracy and real value to practical application? I wish also to say that there are many laboratories which are not influenced by this expensive fallacy, and where accuracy is the first requirement. In all such places the cost per determination may be high, but the actual value to the company is correspondingly large, and costly controversies over disputed results are rare or unknown. The very fact that results come from certain laboratories stamps them as correct and allows them to pass unchallenged. This is the reputation to be envied and strived for in all chemical work.

We are all familiar with the trouble caused by poor chemical work. An instance may be mentioned of a company who had shipped some 1500 tons of iron, all reported by the furnace chemist as within the contract specifications. The iron was rejected by the buyer and the furnace chemist's analysis proven much in error, resulting in a loss to the furnace company in freight, demurrage charges and sacrifice in price of nearly $2000, an amount probably exceeding the cost of maintaining the laboratory a whole year. We will not even mention the loss in reputation which such a blunder entails.

Another factor tending to produce unsatisfactory conditions in furnace laboratories is the low price paid responsible employees in the laboratory.

Again, it is not to be implied that none but college graduates will succeed as iron chemists, but the employment in so responsible positions as that of furnace or foundry chemist of men or boys with no scientific education other than what is commonly acquired by a few years' experience as laboratory boy, crusher, weigher, &c., is questionable economic policy, as results are constantly showing.

In the past one method of insuring this highest degree of accuracy in the best laboratories has been the practice of sending out occasional samples of various products to independent chemists in order to obtain a check on analyses. Frequently the expense and bother of this plan, while necessary to the best results, are considerable, and the American Foundrymen's Association is certainly to be congratulated upon having found and successfully put in operation a plan by which their difficulties are overcome, retaining at the same time all the advantages of the old way, and more. The starting of the bureau of national standards for analyzed pig iron by a committee of your association has marked a new era in the accuracy, and hence the general value, of iron analyses. The value of such properly analyzed samples is so apparent to the chemist as to appear self evident and to need no further discussion. It is invaluable in very many ways.

In all volumetric methods, the rapid and commonly employed ones, solutions must be standardized with some substance of accurately known composition. Such solutions are best prepared by using as a standard material of the same approximate composition and character as that for analysis of which the solution is to be employed. With this in view your committee has secured such a variety of kinds of iron for the standard samples as to cover all ordinary needs of foundry or furnace practice.

Even for gravimetric determinations, where the substances are to be weighed, it is always a satisfaction and a guarantee of accuracy to the chemist to possess material whose composition is accurately known, because by occasionally analyzing this along with the routine work any harmful impurities of reagents or other causes of inaccuracy are at once and most certainly detected. Such samples are also in constant demand for color carbon comparison standards.

The care and patience with which these samples were made at the foundry and their method of casting to insure uniformity of composition were almost sufficient to do away with the need of further care, but even this was not assumed to be enough. The samples were cut to a powder, all sifted thoroughly, then spread out on large glazed surfaces and intimately mixed.

In filling the individual bottles they were all spread out on this same glazed sheet, and from each shovelful taken up a very little was sifted into each bottle. The contents of every single bottle of this, upon proper mixing by the purchaser upon its receipt from the express

agent, must be exactly the same as every other bottle in the whole sample made, and all results so far reported have shown this end to have been achieved.

An interesting discussion followed, in which Thomas D. West of Sharpsville, Pa.; Paul Kreutpointner of Altoona, Pa., and Fred W. Bauer of Springfield, Ohio, participated, each of whom elaborated on the ideas presented in the paper.

C. J. Wolff of Chicago read a paper entitled

"The Advantages of a Foundry for Light Castings on an Upper Floor."

I thought it might be found interesting to some of yon to hear and know about an iron foundry melting 70 to 80 tons per day, with a clear molding floor of 125 x 540 feet long, located on the third floor. The foundry, being above the house tops in the neighborhood, always has unobstructed light and the air is so pure that in summer the birds seem to think it a nice place to perch on the beams of the roof construction and watch the molders while singing their little songs to an appreciative audience. The molders do not leave their work so frequently for refreshments and are not disturbed by visiting friends and inquisitive strangers. The dampness arising from ground molding floors, which is often the cause of rheumatism and colds, is avoided. The smoke and steam incident to starting the cupola and casting iron are quickly dissipated by the breeze that has unobstructed passage through the windows, and being so high above ground does not bother people living in the neighborhood, making it at all times a pleasant place to work in.

The building is of mill construction. The foundry floor consists first of a 3-inch matched floor on the joists; above this is a coating of tar paper, then a cedar block pavement 4 inches high, bonded together and filled with tar and gravel, in the usual way you have seen them laid on our city streets. The molding sand covers this, the dampness of which is sufficient protection. This forms the molding floor. The floor around the cupola is made of steel beams for joists, with brick arches between same; this is covered with ash cement and makes a floor upon which the bottom of cupola can be dropped without any danger of fire.

The cupolas, of which there are two, are situated near one side of foundry at about equal distance from each other and from the ends of the building. The cupolas stand on foundations of brick built up from the ground, which are used for vault purposes on the lower floor. The charging floor or scaffold is of iron on steel beams, large enough to hold pig iron and coke for the day's melt, which are taken up in the forenoon, so that when the blast is on the charging is done with ease and dispatch. The blowers are placed on the ground floor, wtih the blast pipes running up to the cupolas. The jarring effect caused by charging the cupola and the vibrations of blowers having no bearing on the foundry floor do not in the least jar the molding floors.

The foundry is built with clear story in the middle like most foundries now put up. The roof is supported by steel truss work with a span of 60 feet in middle of transverse section, thus leaving 32 feet on each side of trussed section. The posts in foundry supporting the trussed roof are of cast iron and do not interfere with molding floors, as they are alongside of gangway. These iron posts also support an overhead I beam tram rail, on which the trolleys which carry the bull ladles travel for distributing the molten iron to the molders throughout the foundry. This track system is so constructed that iron can be taken from the cupolas to either extremity of the foundry. One man can with ease pull a ladle holding 800 pounds of iron.

This system of handling iron does not jar the floor. The steam elevators deliver pig iron and coke to the charging floors of cupolas, and the trip from ground floor to scaffold does not take much longer than to hoist material from ground to scaffold of cupola in a foundry situated on the ground floor. Iron and coke can be piled contiguous and easy of access to elevators.

The castings are taken down to the cleaning room on a belt elevator on the opposite side of the foundry. The molders put up their work in the morning and early afternoon, and after pouring off they go home. A night gang shake out castings and wet down sand. When the molder comes to work in the morning his sand heap is ready for him, and the castings have all been taken away in hand trucks early in the morning, each truck holding the castings made by one molder. The castings are checked up on leaving the foundry and again in the cleaning room. There is a steam elevator back of each cupola and one belt driven one. These three elevators take care of all castings, new molding sand, pig iron and coke, together with the needs of the departments on second and first floors. A large range boiler and tank shop and machine shop and other works connected with the preparation of castings for enameling are on second floor. These departments are never troubled by dropping sand or smoke or steam from foundry, thus making this second floor as good for any use as if there were no foundry above it. The first floor is used for finished stock, shipping room, rattle room and enameling shop. A basement at one end of the factory contains a winter supply of sand. There are no long hauls in disposing of castings from foundry; they simply need to be lowered, which does not take much power. We make castings up to 800 pounds in weight, using a number of 3-ton traveling cranes.

Incipient fires are very unusual, and we do not think our foundry at all dangerous. Our insurance rate for the foundry is not increased by reason of our location.

We have a pattern house across a 16 foot alley, connected with the foundry by an iron bridge. We had a disastrous fire some years ago on a Christmas Eve—its origin was unknown. Some heavy wooden truss work holding the roof spans contributed to the spread of the fire. The pattern house, which contained all our master and many working patterns, was not burned, which proved a blessing in our misfortune. In rebuilding we used iron roof construction and effected some other improvements, such as building two fire walls with iron doors, thus dividing the building into three sections, but while working it is practically one large room.

Having started this style of foundry 18 years ago as an experiment, much to the amusement of our neighboring foundry friends, we found it to have so many advantages that when 12 years ago we needed a larger foundry we built our present factory and have since had many inquiries from people contemplating building new foundries, many of whom have followed our example. Among the advantages we consider we have are the great economy in ground covered, the protection against obnoxious and obtrusive visitors, the inconvenience for the men to leave their work readily and also the means afforded for better light and air.

In reply to questions Mr. Wolff stated that the character of the work done in his foundry is light castings for the plumbing trade, consisting of bathtubs, soil pipe, fittings, &c. The cupola is dumped on the foundry floor, which is perfectly fire proof, the debris being broken up and removed when cold the next morning.

In the absence of the author the secretary read the following paper prepared by Eli Millett of Springfield, Mass., entitled

"The Construction of Brass Melting Furnaces."

Our idea in this paper is not to show how cheap furnaces can be built, nor how many tons of metal can be melted in five minutes. We think that the brass foundry should be as well equipped as the iron foundry. The old cupola, blower and crane have all made way for the modern ones. The same is true of the old fashioned core ovens; they also had to make way when the now well known Millett oven put in its appearance, and which is now rapidly replacing the old oven all over the world. The old brass melting furnaces, with their brick piers which are always tumbling down, are being replaced by furnaces for which letters patent have been granted to E. P. Marsh and E. Millett of Springfield, Mass.

The construction embodies several furnaces arranged on opposite sides of a main flue running longitudinally between them. These furnaces are supported upon a sub structure or base which is practically indestructible, for it consists of masonry and wrought iron I beams, running lengthwise and crosswise within and on the base. The main furnace flue, which connects with the chimney, runs along over the top of the base between the lines of furnaces, and a suitable flue connects each furnace with the main flue. The top set of I beams, running crosswise on the base, projects out beyond the sides of said base. Resting on these beams are the furnaces, which are bolted through the top and bottom plates to the beams. Therefore no use that the furnaces themselves may be subjected to can vary the proper condition of the base as to supporting the furnaces perfectly in place.

The furnaces are also united by connecting straps, front and back. Each furnace is provided with a grate, hung and supported in the usual way. The pits are covered with iron grating and this, with the absence of brick piers assures an equal distribution of draft. It also enables the melter to instantly detect any leakage of metal from the pots.

The main flue is carried up somewhat above the top of the furnaces and is well covered with iron plates and masonry. On this is placed a cast iron box opposite each furnace for holding metal to be used in the furnace. This last arrangement provides for the laying of the metal into proper charges for each crucible and placing them in each box. By doing this greater care can be exercised in the mixture of metal for each curcible than is possible when the metals are strewn around the floor of the foundry, as is generally done. The provision of a comparatively large main flue, which answers for all the furnaces and which gives a comparatively uniform draft, insures a uniform speed, so to speak, for melting the metal in all the pots.

A plant comprising 18 furnaces arranged on the above plan has been in constant use in the foundry of the E. Stebbins Mfg. Company, Springfield, Mass., for about a year, and it has there been proved that the melting of metals is much greater and thereby more economical by

this construction of furnaces than by furnaces ordinarily used.

Discussion.

A. W. Walker of Boston described the brass furnaces used in his foundry, which, instead of being supported on beams underneath, are hung from joists above, which he thought much more simple. He thought that the method of supporting a brass furnace was hardly important enough to patent, as other good ways could be found than that covered in the paper. He proceeded further to describe the methods used in his foundry, stating that an ash pan is hung under each brass furnace to keep ashes from falling on the floor and thus creating a great deal of dirt and dust When a pan is filled two men lift it off and dump the ashes in a car near by to be taken away. S. T. Johnston of Chicago asked if any one had made a comparison of the advantages of natural draft with forced draft in running a brass furnace. In reply C. J. Wolff of Chicago stated that in his foundry forced draft has been found preferable to natural draft. A fan blows into the chimney at such an angle that it operates as a suction. This has been found to make the draft much stronger and the furnace runs hotter than when depending merely on the ordinary chimney draft.

Thos. D. West of Sharpsville, Pa., read a paper, from which extracts are given as follows, entitled

"The Deceptive Fracture of Pig Iron."

The fact that many founders still adhere to the old school practice of judging pig iron by its fracture causes some to suffer losses or meet difficulties that would not exist did all founders understand the utility and value of chemical analyses in defining the grade of iron, and follow its dictation in their practice. Not long ago, in discussing the merits of working by chemical analysis with an old experienced founder, who had never mixed his metals by this method, he expressed the belief that if a cast of nice open grained pig iron did not give a softer iron than a close grained pig mixture it was because of some local condition not being controlled; as, for example, he claimed that the cupola might not have been daubed properly, or the bed not well lighted before the iron was charged, or the charge might not have been placed evenly, or that the stock hung up. Then, again, he claimed that it might be due to other conditions, such as to be found in bad scrap iron, changeable weather, difference in fuel, fluxes or variable blast pressures to cause fast or slow melting, &c. When as practical foundrymen we know that such varying conditions may at all times affect mixtures and cause a soft iron to be hard, we are forced to confess that the old school fellows may go along for years, if they are in any way prejudiced against the new school practice, before events may transpire to convince them that by following chemical analysis they will greatly decrease their mishaps, for the simple reason that if an open cast of pig metal does not happen to give them a hard iron they have nearly a dozen evils or excuses to which they can charge their poor results. A study of this phase of the subject should explain why some are slow to accept chemical analysis in selecting and mixing their pig irons, and also that whenever it suits the self interest of any to prejudice the utility of chemistry in the mind of the old school founder they can easily do so by taking advantage of their prejudice and want of knowledge which the new school possesses.

The foundation of the old school method in regulating mixtures is based on the belief that the appearance of pig fractures truly defines the character of iron as to the degree of hardness. The founder's own experience in knowing that he can make soft and hard castings from the same ladle and at one pouring, if he choose to so construct his molds, should be sufficient to prove to him why it is possible for two furnace casts of pig metal that are alike in chemical analysis or will give the same results when melted to differ so widely in appearance that the fracture from the one cast will seem close grained or hard in the pig, while the other will be the reverse. A founder can take the same ladle of iron, and by pouring part of the metal into a mold that will chill or solidify it quickly produce a fracture that will be close grained in the one case and open in the other. This is just what the furnace man does in making pig iron. One part of his tap or cast of iron may run so slowly from his furnace as to chill the metal before it reaches the pig beds, while another tap or cast may come so fast as to fill the pig beds so rapidly that it will take quite a while for the metal to solidify.

Again, one tap or cast at a furnace may give much hotter iron than another, and it is natural that the dull iron should cool faster than the hot, and if both run at the same speed from the furnace down the long runners to the pig beds will give the closer grained iron in the case of the duller metal. Surely the founder should perceive from this why the same kind of iron may have in one cast a close grain and in another an open grain. As there are but few molders or founders who have ever had the opportunity of witnessing a furnace cast, this explanation of its workings, combined with their own foundry experience, should assist many to realize why the fracture of pig metal is an unreliable guide to the iron's true grade.

There are those who are still sure to contend that open fractures mean a soft iron and a close grained iron a hard one, and if different results are obtained to charge such to changes in fuel, scrap iron, fluxes, blast, weather, &c. The writer has selected samples of pig that are a fair representation of a whole cast or car of iron. If any of the old school founders were asked to select a cast or car of iron to give soft castings, they would pick out iron such as sample A, while if they desire to make strong or hard castings they would select such irons as are represented by sample B. In fact, if they were asked to use such a cast or car of iron as that represented by B, they would claim that on account of its close grain and blowholes seen the iron was hardly fit for sash weights, let alone to think it of any value to make soft castings.

In order to convince the skeptical or those not conversant with chemical analysis or the effect of one metalloid upon another that they are in error the writer melted down about 100 pounds of each of the grades A and B in his twin shaft cupola described in a paper before the Pittsburgh Foundrymen's Association June 28, 1897. In melting these irons A and B to make the castings shown, and which range from ⅛ to 2 inches in thickness, all conditions were alike as near as it was possible to have them, so that if the open grained iron A gave a hard casting, changes in fuel, scrap, blast, weather, &c.—the old excuse—could not be offered as an explanation to befog the true cause. The sample of pig used and sections of the castings made from them the writer has brought to this meeting so that all may see them, and all are invited to take drillings from the specimens to report whether their analyses agree with those represented in table I.

Table I.

Samples—	Silicon.	Sulphur.
Pig	1.25	.035
Castings	1.15	.070
Pig	2.86	.040
Castings	2.67	.060

To the new school founder table I is sufficient to define the results, or whether samples A and B would give the soft or hard iron upon being remelted, but for the old school of founders tables II and III will best serve such ends. A study of these latter tables will show them that the pig B, which would have been condemned by those wishing to make soft castings, gave by far the least contraction and chill, so much so that the test pieces, only ⅛ inch thick, are so soft as to be readily drilled, while one made from sample A broke a drill in trying to get one hole through the thin piece ⅛ inch thick. In fact we were foolish to try to touch it with a drill, as the metal was nearly all chilled or white in color. It is also to be said that all the other test pieces that were made from the pig, sample A, were also much harder than those made from sample B. In measuring the depth of a chill pieces were broken off one end of the test bars.

Table II.—Record of Tests Taken from Iron, Sample A.

No. of bars.	Size of bars.	Contraction.	Deflection.	Strength. Pounds.	Chill.
1	½ x 1½	0.293	0.29	110	Nearly white
2	½ x 1½	0.266	0.25	320	¼ deep
3	⅝ x 1½	0.242	0.21	550	¼ deep
4	⅝ x 1½	0.220	0.18	860	⅛ deep
5	⅝ x 1½	0.200	0.15	1,280	⅛ deep
6	¾ x 1½	0.182	0.14	1,600	⅛ deep
7	⅞ x 1½	0.165	0.12	2,240	⅛ deep
8	1 x 1½	0.150	0.10	2,900	⅛ deep
9	1¼ x 1¼	0.148	0.08	3,640	⅛ deep

Table III.—Record of Tests Taken from Iron, Sample B.

1	½ x 1½	0.178	0.35	164	0.03 deep
2	½ x 1½	0.163	0.030	344	0.02 deep
3	⅝ x 1½	0.150	0.24	530	0.01 deep
4	⅝ x 1½	0.137	0.18	920	H'dly perc'ble
5	⅝ x 1½	0.125	0.14	1,208	No chill
6	¾ x 1½	0.112	0.12	1,640	No chill
7	⅞ x 1½	0.101	0.11	2,320	No chill
8	1 x 1½	0.92	0.10	2,860	No chill
9	1¼ x 1¼	0.88	0.10	3,500	No chill

This chill was obtained by causing the end of the test bars furthest from the gate to be formed by a wrought iron bar ¾ x 2 inches wide. The 12 test bars were molded in green sand and poured from one gate. The same "temper" of sand was used for both flasks, and the iron was alike in fluidity at the time of pouring.

It is hoped that a study of this paper will help to convince those yet remaining aloof from utilizing chemical analyses that the deceptive fracture of pig iron has and will continue to often mislead them in rightly locating the cause of trouble and losses in their efforts to obtain desired results from iron mixtures.

This paper was discussed by Mr. Kreutzpointner, who said:

The selection of the proper grade of pig iron is the foundryman's great concern, and Mr. West has pointed out very clearly in his paper that one of the principal weapons with which the foundryman fights the industrial battle of to-day is antiquated and defective, inasmuch as the present method of selecting pig iron by fracture is defective and misleading.

How is the structure formed which we see on breaking a pig? A molten mass of iron in the blast furnace, cupola or ladle is a combination of chemical elements held in solution by the fluid mass of iron as salt or sugar is held in solution by water. Each of these elements, when for itself, has a different melting point and point of cooling.

As soon as the iron gets cold enough crystals form, and these crystals try to extract out of the surrounding fluid metal all the elements which are necessary to its growth. Thus the crystals grow as long as they have an opportunity to absorb some of the substances surrounding a crystal. Hence, if we cool the iron quickly we prevent the crystals from growing any further, and they will have the size, therefore, which the crystals had when stopped from further growth, and not the size representative of any particular chemical compound, generally speaking. A couple of years ago I came across a very striking instance of the effect of time in cooling on the size of the structure of iron and steel. A large amount of the contents of an open hearth furnace had broken through the bottom of the furnace. The bottom was repaired and the metal left where it was until the furnace had to be torn down. Here was an opportunity for the escaped metal to cool very slowly. As a consequence the crystals in that mass of soft steel were of extraordinary size. I obtained a well formed crystal which measured 1⅜ inches in length and ⅝ inch in width. I have still a piece of that metal with a crystal imbedded measuring ⅝ inch. Ordinarily the crystal of such steel in the ingot measures a few hundredths of an inch.

Now, while such an intance is very rare, yet it furnishes proof of the importance and influence of time in cooling a molten mass of iron on the size of structure, irrespective of chemical composition.

You can readily imagine the gradations in size of structure, due to time of cooling, between the crystal 1⅜ inches long and the fine structure we might be able to obtain in the same metal by instantaneous cooling of the mass.

For the same reason an iron low in silicon may have as coarse, if not a coarser, fracture than an iron higher in silicon and graphitic carbon.

There is another property of cast iron with which the foundrymen are very much concerned, but which thus far has not received the attention it deserves. Cast iron is an alloy composed of iron and other substances. Now the melting point of alloys varies with the variation of the per cent. of constituents forming an alloy. Thus, for instance, wrought iron melts at 2912 degrees F., gray iron at 2280 degrees F., white iron at 2075 degrees F., an alloy of 1 tin and 25 lead melts at 558 degrees F., while an alloy of 6 tin and 1 lead melts at 381 degrees F. The melting point of tin alone is 451 degrees F., and that of lead is 618 degrees F. Naturally an increase of number of elements in an alloy and variations of percentage of these elements will produce complications in the melting points of alloys. These complications are increased by the law of affinity, according to which certain elements will attract each other and combine with one another more readily than other elements. It must be obvious that during the formation of such complications the rate of cooling plays again an important part.

But to fill the foundryman's cup of bitterness and perplexities to overflowng there is the phenomenon of segregation in alloys, and cast iron is very much bothered by this phenomenon. Iron, like water, has the ability to dissolve and hold in solution foreign substances when in a fluid state. But when a fluid mass of iron cools down to the point of solidification the foreign substances, held in solution while the iron was fluid, segregate out of the iron one after another, as salt segregates out of the water whenever there was more salt dissolved in a hot brine than the water can hold when cold. Now the iron can hold more carbon, silicon, &c., chemically combined, when in a fluid state than it can hold when in a solid state. Consequently, when a molten mass of cast iron freezes, such of the foreign substances having been held in solution by the molten iron as cannot be held chemically combined by the solidified iron will be pushed out, or segregate out, until the mixture reaches certain proportions. This mixture, having reached such proportions of elements as are peculiar to cast iron, will be the last portion in a casting to freeze or solidify. This mixture in alloys, freezing last, is called the mother metal in alloys of metals, and mother liquor in other mineral solutions, for cast iron and pig iron are nothing but mineral solutions after all.

According to Roberts-Austen and Jueptner von Jonstorff the mother metal of cast iron is composed of 95.7 per cent. of iron and 4.3 per cent. of carbon. The mother metal of an alloy of copper and silver contains 28 per cent. of copper and 72 per cent. of silver. Whenever, therefore, in an alloy an excess of elements is present over and above the proportions necessary to form the mother metal, then this excess will separate or freeze out or segregate out of the molten mass and solidify before the mother metal freezes or solidifies. This is the reason why a plumber can make a wiped joint. If he would take a mixture of lead and tin, or whatever metals he uses, of such proportions as to just form the mother metal of a tin lead alloy he could not make a wiped joint, because his mixture would freeze or solidify under his hands so quickly that no time is left to wipe the joint. But, having an excess of lead, this excess freezes first, and continues freezing while the plumber is wiping his joint, until so much of it has frozen or segregated out of the mixture as to leave the proper proportions of metals for the formation of the mother metal. When that point is reached the whole of the mixture solidifies at once and altogether without any further segregating out of the one or other of the metals.

Now this same action takes place in cast iron or other alloys, and this segregating out of the excess of elements in alloys, over and above those proportions necessary to form the mother metal, or entectic alloy, as scientists call it, is a disturbing factor of unknown influence in the brass and iron foundry. On account of this cast iron has two cooling points instead of one. In other words, the excess of elements present over and above the mother metal solidify first and at a higher temperature than the mother metal.

For instance, a mixture of cast iron with 98 per cent. of iron and 2 per cent. of carbon will solidify at 2408 degrees. But if the iron is given a long time to cool, long enough for the segregating out of the excess of iron over and above 95.7 per cent. of iron and 4.3 per cent. carbon, which is the mother metal of cast iron, then that iron will solidify at two different temperatures—viz., the excess at about 2408 degrees F. and at 2066 degrees F., which is the cooling point of the mother metal or entectic alloy of cast iron. According to Charpy, bronzes may sometimes have three, or even four freezing points.

The practical lesson for the foundryman from all this is, if he knows he has the right mixture for a given purpose, to try and pour his iron at a sufficiently low temperature, so as to prevent segregation as much as possible in large castings. Under unfavorable circumstances such segregated castings, in spite of the fact that the chemical composition is all right, may be weak because of the want of homogeneity in the structure. The casting may appear solid enough, but where a casting happened to solidify at two different temperatures the structure or grain cannot be uniform throughout the mass, and there is liability that lines of weakness run through the casting between the juncture of patches of coarser grain and finer grain. We can also readily see that it is not always the chemical composition alone that secures a good, strong and sound casting. We can also readily imagine what possibilities there are in alloys in general, and cast iron in particular, for the formation of an endless variety of combinations and complications, due to this peculiarity of segregation in alloys of metal. And the greater the number of elements present the greater the liability for complexities.

A letter was read from Joseph Best of Montreal, Canada, one of the vice presidents of the association, regretting his absence, which was caused by a strike among his workmen.

W. A. Jones of Chicago, chairman of the Committee on Nominations, presented a report submitting names for the several offices, and they were unanimously elected by the association as follows:

President, J. S. Seaman of the Seaman-Sleeth Company, Pittsburgh.

Secretary, John A. Penton, Detroit.

Treasurer, Howard Evans of the J. W. Paxson Company Philadelphia.

Vice Presidents:

New England States, A. W. Walker of the Walker-Pratt Mfg. Company, Boston.

Middle States, Dr. R. G. G. Moldenke, McConway & Torley Company, Pittsburgh.

Southern States, J. P. Golden, Golden's Foundry & Machinery Company, Columbus, Ga.

Central Western States, C. A. Bauer, Wardner, Bushnell & Glessner Company, Springfield, Ohio.

Northwestern States, W. A. Jones, W. A. Jones Foundry & Machine Company, Chicago.

Southwestern States, W. S. Mosher, Mosher Mfg. Company, Dallas, Texas.

Pacific States, R. Chartrey, Joshua Hendy Machine Works, San Francisco.

Canada, Joseph Best, Warden King & Son, Montreal.

A statement was made by Secretary Penton alluding to the growth of the National Founders' Association, the desire by that body for more of his time as its secretary and the probability that he might find it necessary to retire from the secretaryship of the American Foundrymen's Association, but that he had not yet decided what course to pursue.

Mr. Seaman was brought forward and installed as president, making a very appropriate speech accepting the position, and promising to discharge its duties to the best of his ability.

The retiring president, C. S. Bell of Hillsboro, Ohio,

was given a vote of thanks for his able administration of the duties of the office and was elected an honorary member of the association.

After the usual resolutions of thanks to the members of the local committee and the hospitable citizens of Pittsburgh the association formally adjourned.

No decision was announced as to the place of holding the next meeting, which is in the hands of the Executive Committee, composed of the officers. The candidates for the honor of entertaining the association next year are Chicago and Boston. Earnest written invitations to make Chicago the next convention city were received from Mayor Harrison of Chicago and from a number of the prominent business houses of the city.

Outside the Convention.

The excursion on Wednesday afternoon to the great Westinghouse shops at Wilmerding and East Pittsburgh was greatly enjoyed by members of the association and their friends. A special train on the Pennsylvania Railroad had been supplied by the courtesy of the Westinghouse Air Brake Company. The train first stopped at Wilmerding, where the plant of the air brake company was visited. The time was too short to inspect the entire works, so that portions of the foundry and machine shops only were seen. The foundry has been described in these columns and it is sufficient to say that the method pursued here is unique, inasmuch as no molding floors or benches are used. Molding machines are largely employed, some operated by hydraulic power and others by compressed air, while considerable hand molding is also done. All cores used are green sand cores, which are placed in molds as soon as they are taken from the clamps. The flasks are placed on a slow moving endless platform conveyor running the full length of the foundry and making a sharp turn at the ends. The molds are poured as the flasks pass in front of the cupolas, so that the iron is carried but a short distance, an overhead trolley being used for this purpose. At the opposite end of the conveyor from the cupolas men are placed who take the molds and shake out the castings on a grating in the floor. The sand falls through the grating on an underground conveyor, on which a stream of water is thrown to cool it, after which it is elevated to an overhead conveyor, which carries it to hoppers above each molder's station, from which the sand is dropped through a chute just as the molder wants it. The sand is thus used over and over again, and by this method no heaps of sand encumber the floor of the foundry. After the castings are shaken out on the grating they are picked up with tongs and thrown on a heap near by whence they are taken away for cleaning. Three of these endless platforms are in use in this foundry. The continuous production of the same patterns enables a scheme of this kind to be worked out in an ideal manner. The saving of labor is enormous and the production per man is very great. The machine shop presented a wonderful array of all kinds of machinery necessary for the finishing of the parts of air brakes.

The train next proceeded to East Pittsburgh and a stop was made near the works of the Westinghouse Machine Company. They are builders of steam and gas engines, mechanical stokers and ice making and refrigerating machinery. The machine shops and foundry were inspected and engines were seen in all stages of completion. These engines comprise the Westinghouse compound, standard and junior engines, either built alone or in generating sets direct connected with a dynamo, from 5 horse-power up. They also build engines of the marine type with a nominal capacity of 2500 horse-power, but easily developing 3500 horse-power. The gas engines built by the company embrace types considerably in advance of anything attempted by other gas engine builders. They build three-cylinder engines as large as 750 horse-power. One of these large engines is in regular and satisfactory use in the works of the Westinghouse Electric & Mfg. Company. Some time was passed in visiting the plant of the latter company, after which light refreshments were served and the train returned to Pittsburgh.

A reception was held on Wednesday evening at the Hotel Schenley, where entertainment was provided, consisting of a musical programme embracing orchestral and vocal music, and the visitors here had an opportunity of socially meeting the citizens of Pittsburgh and their ladies. Every arrangement had been made to give the visitors a good impression of the courtesy and hospitality of Pittsburgh people.

An excursion had been contemplated by boat to the Homestead works of the Carnegie Steel Company on Thursday afternoon, but owing to high water in the Monongahela River this plan was changed and the trip was made by trolley cars. Several hundred persons participated in this excursion. On arriving at Homestead they were conducted through one of the open hearth steel plants, where they witnessed the process of charging the steel furnaces with molten pig iron brought by car from the Duquesne blast furnaces. They also saw the operations of electric charging machines, handling ingots in and out of the heating furnaces. The large slabbing mill and plate mill were inspected and a trip was made through the largest beam mill. Only a small part of the works was visited in the limited time at the disposal of the excursionists, but enough was seen to greatly impress them with the magnitude of this tremendous establishment. The return trip to the city was made by way of Calhoun Park, where a brief stop was taken for refreshments provided by the local Entertainment Committee.

On Thursday evening a smoker was enjoyed at the Monongahela House, which ended the programme laid out at the beginning by the local committee.

In addition to the exhibits noticed last week as shown in the parlors and corridors of the Monongahela House was a notably fine display of selected 72-hour coke by the H. C. Frick Coke Company of Pittsburgh. Another interesting display was a set of cast iron plates punched with a rapid punch by A. Speer & Sons, plow manufacturers, Pittsburgh. The holes were perfectly smooth, even to 13-16 inch holes in $\frac{5}{8}$-inch plates. The castings were made of Clinton foundry iron with a small mixture of scrap.

It is understood that John Penton of Detroit has definitely decided not to accept the position of secretary and has placed his resignation in the hands of the Executive Committee, which consists of the president, vice-presidents and treasurer. He came to this conclusion largely on account of the pressure of other official duties. He is now secretary of the National Defense Association and also of the National Association of Manufacturers of Malleable Castings. His additional duties as secretary of the American Foundrymen's Association would require too much of his time, and he has therefore decided to resign the secretaryship of the last named organization. In doing so at this particular time he feels that no action is taken prejudicial to the interests of the association. The organization is prospering, some 40 new members having been added at the Pittsburgh meeting, and no reason exists why an exceedingly prosperous career should not be in store for it Mr. Penton has been secretary for three very successful years and the man who follows him will find the way much smoother by reason of the hard work done in the opening up of the field of labor for this new organization.

The Consumption of Pig Iron.

Rogers, Brown & Co., the well-known pig iron commission merchants, have published the results of investigations among foundry pig iron consumers in New York, Boston, Philadelphia, Buffalo, Cleveland, Cincinnati, Chicago and St. Louis districts, relative to the probable consumption this year. Their conclusions derived from this investigation are very interesting, as follows:

The general average of all the reports shows an expected increase in consumption for 1899 over 1898 of 35 per cent.

Furnace stocks and actual production during the past three years are shown in the important figures following:

Stocks April 1.		Weekly make for previous month reports April 1.	
1897	1,092,113	1897	177,187
1898	814,951	1898	235,279
1899	302,628	1899	243,179

The pig iron production of the United States, taking certain decades, becomes very interesting in a consideration of the present situation, as up to 1890 production about doubled every ten years:

	Gross tons.		Gross tons.
1859	750,559	1860	821,223
1869	1,711,285	1870	1,665,178
1879	2,741,852	1880	3,835,191
1889	7,603,638	1890	9,202,703

In 1898 production was 11,773,934 tons, and if "history repeats itself" 1899 should furnish 15,000,000 tons at least, which is altogether impracticable.

The indications are that the country has not made provision for the expanded business and extraordinary demand.

The probable increase to be realized this year over last in the blowing in of silent furnaces throughout the country together with the few new ones yet to be completed will add to the production of 1898 approximately 1,100,000 tons, so that this year's production will probably reach 12,875,000 gross tons. If expectations of those planning to start furnaces are fully realized the year's output will go to 13,500,000 tons.

The second annual meeting of the American section of the International Association for Testing Materials is to be held in Pittsburgh, Pa., on August 15 and 16 next. Three sessions will be held, for the reading of papers and addresses, reports of committees and special discussions, and opportunity will be afforded for visiting testing laboratories and industrial establishments.

Steel Track Wagon Roads.

WASHINGTON, May 20, 1899.—Martin Dodge, director of the Office of Road Inquiry of the Department of Agriculture, has prepared an interesing monograph on the subject of steel track wagon roads. Readers of *The Iron Age* will remember a publication in these columns a year ago of the results of certain experiments made under the supervision of Gen. Roy Stone, who was Mr. Dodge's predecessor in the Department of Agriculture. Since that time much more expensive tests have been made, the results of which are given below, taken from advance sheets of Mr. Dodge's report through the courtesy of the Secretary of Agriculture.

"The steel track wagon road is still in the experimental stage. Much has been written and proposed in a theoretical way during the last six years or more, but nothing has been done by way of actual tests till very lately. The three principal advantages to be sought in the new construction are cheapness, durability and reduction of power required to move a vehicle. As to the last two elements, all are agreed that the steel track solves the problem. In reference to the cost and manner of construction there is a great diversity of opinion. Many of the plans first submitted and published provided for a substructure of wood in some form to support the steel tracks. In 1894 F Melber of Pittsburgh, Pa., and W. I. Ludlow of Cleveland, Ohio, both submitted plans to the National Road Conference, which met at Asbury Park July 6 of that year. These plans show wooden substructures of plank, not only to support the steel track, but also to form the treadway for horses or other animals. This wooden substructure adds to the cost of construction without adding to the real value or utility of the road, and can therefore be omitted with advantage, provided we can so adapt the steel track to the roadbed that it will combine with the materials composing the latter in such a way as to form a substantial and integral part of it. Abel Bliss of New Lenox, Ill., and Mr. Melber have each put down, as private experimenters, a short section of 25 or 30 feet to represent their ideas of the best form of construction. These sections are, however, too short to furnish any full and sufficient tests as to the value and utility of such roads as we have under consideration.

"It was not until the fall of 1897 that any public authority was given by any public officer or officers to undertake to test the value or utility of the steel track wagon road. At that time the county commissioners of Cuyahoga County, Ohio, authorized the writer, by contract, to lay 500 feet of steel track on the Brecksville road, immediately south of the city limits of Cleveland. The form chosen for this track was one designed and recommended by Mr. Melber, but without the wooden substructure provided for by him in 1894. This track was not completed till June, 1898, and has been somewhat disturbed and obstructed since by reason of grading done adjacent to the track by the contractor who was charged with carrying out more extensive improvements on the Brecksville road. This track, when completed, presented a fine appearance and will doubtless give satisfactory results, but sufficient time has not yet elapsed to test it thoroughly in every respect.

Tests of Utility of Steel Track Wagon Roads.

"All steel tracks heretofore placed upon highways have been laid without the aid of the Government, but the Secretary of Agriculture determined to undertake, through this office, a test as to the utility of the steel track, made and laid so that vehicles without flanged wheels might have the great advantage of a smooth track heretofore enjoyed only by vehicles with the flanged wheels. The writer, upon being appointed director of the Office of Road Inquiry, immediately began preparations to build a sample steel track wagon road, which should permit of making tests as to the cost, value and utility of such a road. For this purpose he secured a suitable space on the grounds of the Trans-Mississippi Exposition at Omaha, where the results might be seen by the greatest number of people, and constructed such a road as he had recommended before, but which had never been fully tested. The road thus laid consists of two parallel lines of steel plates, 8 inches wide, laid at a sufficient distance apart to receive the wheels of vehicles of the standard gauge. These plates have a slightly projecting flange upward and on the inner edge, so as to prevent the wheels of ordinary vehicles, which have no flanges, from easily leaving the track. At the same time the flanges, being only ½ inch, are not of a hight to prevent the vehicles from leaving the track for the purpose of passing other vehicles whenever the driver so desires. These steel plates are not supported by wooden cross ties or longitudinal stringers of any kind, but are provided with flanges projecting both downward and outward. These flanges are embedded in the concrete of the roadbed so as to form a substantial part of it, and the steel plates are supported at every point by a substructure of cement or other enduring material.

"In addition to the road built at Omaha upon which the traction tests were made, E. G. Harrison, road expert of the Office of Road Inquriy, was directed to lay a short section of 150 feet of steel track road at the agricultural experiment station at St. Anthony's Park, Minnesota. After completing this, September 24, he laid another section of 180 feet at the agricultural experiment station at Ames, Iowa. Both of these sections were made after the same pattern and style as the Omaha road. Reports so far received from these two stations indicate that the two sections are coming up to the highest expectations.

The Function of Cross Ties.

"The cross ties used are not for support, but only to maintain the steel plates at a uniform distance from each other, and also to prevent tilting and to maintain the face of the plates in a horizontal position. The road when properly finished contains no perishable material, such as wooden cross ties and stringers, heretofore used and thought necessary for all steel track construction, but forms a smooth, firm and compact mass harder and more durable than a road can be made of any other known material.

Advantages of Steel Track Wagon Roads.

"The three great advantages mentioned elsewhere as being sought for in the steel track wagon road are found in this new roadway, demonstrating:

"1. That the steel track wagon road can be built without greater cost in most cases, and probably with less cost in many cases, than any other hard and durable road.

"2. That it will last many times as long as any other known material for road purposes and with much less repair.

"3. That the power required to move a vehicle over the steel track road is only a small fraction of the power required to move the same vehicle over any other kind of road.

"This last important fact can be taken advantage of either by increasing the load which a given power would be able to move over a common road or by diminishing the power necessary to move a vehicle over the new road. In the experiments made by the Department it was shown that a heavy load of 11 tons required 20 horses to draw it over a common road, while the same load was drawn by one horse over a steel track. This load was 22 times the weight of the animal and was easily moved with a light harness. The load could be increased up to 50 times the weight of the animal and still be started and moved without difficulty. A horseless carriage on the track was moved with such ease as to require but a small fraction of the power ordinarily used for moving such vehicles. A bicycle rider on the track found it so superior as to indicate its suitableness for long bicycle rides through the country, a fact which would doubtless have an important bearing on the extension of rural mail delivery.

Methods for Laying Steel Tracks.

"The method of laying steel tracks should be varied to conform to the material out of which the roadbed is constructed. In a comparatively dry and sandy or gravelly soil these tracks might probably be laid with no other material except the natural foundation of the roadbed itself, and could be maintained in good repair at very little cost. Also the flanges at the lower extremity, which project outward, might be omitted, thereby diminishing the amount of metal required in the rail. What could be done successfully in a sandy or gravelly roadbed might also be done in any soil that could be kept sufficiently dry, either by reason of the climatic conditions or the natural dryness of the soil. But in all wet and clayey soils there should be a substructure of broken stone under each rail 1 foot deep, also macadam between the rails and for a distance of 1 foot on each side. The cavity immediately under the rail should be filled with cement, so as to give a continuous bearing to support the rail at every point. The joints also should be secured by being bolted to a common cross tie. In building on a grade of 3 per cent. or more the rails should be corrugated transversely. No experiment has ever yet been made with such a track upon such a grade, nor is there the material for the corrugated tracks. That will have to be produced by the use of special rolls.

Cost of Construction.

"The cost of constructing the short section of steel track road already built was about $1 per foot, but this is much in excess of the necessary cost when built in longer sections, requiring large quantities of material, and when the rolling mills are equipped with suitable rolls to get the shapes desired without the extra cost incurred in making the 'built section.'

"It is probable also that the weight of steel may be considerably diminished below that heretofore used without materially impairing the value of the road. Before making a positive statement as to what the most desirable weight should be we must observe for a long time the effect of traffic upon rails of different weight, different

shape and different size. It seems, however, that a rail weighing 30 pounds to the yard, 1-5 inch in thickness, and with the cavity immediately below properly filled, so as to give a continuous bearing, will prove to be sufficient. This would bring down the cost of the steel to about $1500 per mile, and there is every probability that time and experience will prove this to be sufficient. To that sum must be added the cost of actually laying the track and bringing the road surface up to it in such a manner as to preserve the surface of the roadbed even with the surface of the steel rail. Allowing an equal amount for that purpose, which is probably sufficient, the road complete could be built for $3000 per mile.

New Methods in Construction of Roads and Vehicles Suggested.

"When John L. Macadam advanced his theory of road building in England in 1816 he called the attention of Parliament to the fact that it had hitherto devoted attention mainly to regulating the size of vehicles, the width of tires, the number of horses to be allowed for each vehicle, the amount of toll to be charged and minor details of that kind, but had paid very little attention to the improvement of the roadbed. To day, on the contrary, nearly all persons interested in the good roads problem are exhausting their efforts upon the improvement of the roadbed only, and seeking to imitate or duplicate the stone roads of the older countries. It is the opinion of the writer that the stone age in road building has substantially passed, and that it is possible to introduce new means and methods by which there will be great gains in four different ways.

"1. The improvement of the roadbed can be effected without increasing the cost of its construction; on the contrary the cost of construction can be diminished one-half or more.

"2. The weight of the vehicle can be greatly diminished in proportion to the load it carries. The bicycle is a notable example of what has been done in this respect. The value of the bicycle depends on the fact that it carries a burden many times its own weight. If it were constructed on the principle of nearly all other vehicles so as to weigh as much as the burden it carries or more it would have no practical value and would not be in use. It is possible to apply the same principle in the construction of other vehicles, at least to the extent that in all cases they shall carry more than their own weight, and in most cases many times their own weight.

"3. Having such vehicles as referred to it is possible to substitute inanimate power for animal power for all distances upward of 5 miles, and by such substitution there would be a gain equal to four-fifths of the present cost for animal power.

"4. There would be an increase in the speed of vehicles and consequently a proportional saving in time.

"The roadbed as commonly constructed is of great width and solidity, yet the burdens passing over these roads are as a rule only from 1 to 2 tons in weight. It is unnecessary and unwise to build for light vehicles roads capable of sustaining burdens 100 times the ordinary weight. The roadbed should be hard and smooth and it can be made so by substituting steel for stone.

"In reference to the vehicle the fault of excessive weight is the result of a natural evolution based upon conditions heretofore existing but now rapidly passing away and capable of complete elimination. The wheels were made high in order to overcome the inequalities of the primitive roadway and to enable the vehicle to straddle extraordinary obstructions in the way. This hight of wheel necessitated great width of gauge in order to prevent overturning the carriage. Great hight and great width called for great strength in the vehicle, and great strength could only be secured by making the vehicle of great weight when constructed of the materials heretofore used for such purposes: so there were constructed and used vehicles whose weight exceeded that of the burdens they carried, and as a consequence the immense sums of money paid for transportation result almost as much from cost of moving the vehicle as from cost of moving the freight it carries.

"In order to remedy this defect the first thing to do is to lower the center of gravity of the vehicle. No real progress was made in the development of the bicycle until the low wheels were used and the center of gravity lowered as much as possible. This example should be imitated in the construction of other vehicles. With the lowering of the center of gravity may easily and safely come a diminution in the width of the gauge, and with these two steps it is easy to reduce the weight of the vehicle especially by substituting the lighter material now available, so that the vehicle may be strong enough to carry ten times its own weight instead of weighing ten times the burden it carries as is often the case with vehicles in common use. As already stated, with a smooth track and a light vehicle placed upon roller bearings it is possible to substitute inanimate power for animal power on all distances of 5 miles and upward, with a saving equal to four-fifths of the present cost for animal power and at the same time giving a great increase in the speed of the vehicle."

W. L. C.

THE WEEK.

The French Government, having experienced considerable difficulty in collecting the tax on bicycles, has introduced a new method of collecting that impost. On payment of the annual cycle tax the authorities provide a small metal plate which the owner is required to exhibit on a prominent part of his wheel. Any machine not bearing the mark will be seized and its owner summoned and fined. The tax levied is $1.20 for an ordinary bicycle, $2.40 for a tandem and the same for a motor cycle. A different style of plate will be issued for each year.

Advices received at Victoria, B. C., report that the main portion of Dawson City, the metropolis of the Klondike, was destroyed by fire on April 26, over 110 buildings, including some of the principal structures of the city, being burned down. The loss is estimated at $4,000,000. The fire was caused by the upsetting of a lamp by an intoxicated woman.

A consular report states that the company owning the street railways in the City of Mexico are about to substitute electric power for the animal traction heretofore employed on the 300 miles of track in the district which embraces the city. Mules have generally been employed for traction purposes on the roads heretofore.

Under American rule the roads of Porto Rico are being rapidly put in good order. According to the latest reports from the island 62 roads were being rebuilt or repaired, and 15,000 men were employed on the work, under the direction of Major F. L. Hills, Director of Public Works of Porto Rico. The construction of these roads is intended to be of a permanent nature. In selecting roads for repairs Major Hills has first opened the main arteries of communication into the interior, which will facilitate the transportation of crops to the seacoast.

In a recent interview Chauncey M. Depew is quoted as saying: "It is a fact not generally known that of the $46,000,000 which the New York Central system earned last year $2,000,000 went for taxes, and only $4,000,000 went to the stockholders. The remaining $40,000,000 was divided among the employees and the persons who sell us supplies."

The State Assembly of Rio de Janeiro, Brazil, has passed a law for the establishment of agricultural schools, the State to provide all necessary lands and a liberal annual subvention for 20 years. The schools will be obliged to receive all orphans sent to them by the authorities. In addition to agriculture there will also be taught botany, physics, chemistry, mechanics, zoology, &c.

The New York Board of Trade and Transportation is sending out invitations to the various commercial and trade organizations of the State for a State Commerce Convention, to be held in September next. The object of the convention is to consider all matters relating to taxation, the laws of business corporations, railroad and canal transportation, and forest preservation. Other questions to be considered are those regarding terminal facilities and terminal charges, improvement of Staten Island and Port Morris water fronts and channels connected therewith, the improvement of the water front of New York City on Manhattan Island and improvements of accommodations for boats on State canals and lake ports.

A large portion of the Government of Astrakhan, Russia, on the northwestern coast of the Caspian Sea, has been submerged by an overflow of the River Volga, which divides it into two nearly equal parts.

Prof. Lewis Haupt of Philadelphia, one of the three commissioners who made a study of the Nicaragua Canal, and whose report has just been submitted to the President, believes that $125,000,000 will be ample to build and equip the proposed waterway. "If the canal were finished now," he says, "the total tonnage that would pass through it would aggregate in 12 months over 3,000,000 tons, of which the United States would contribute about 1,900,000, England 1,100,000, France 170,000 and other countries 50,000. The value of the tonnage and the trade affected would be nearly $500,000,000. The greatest benefit would accrue to the United States, and the saving effected in three years would probably equal the cost of the canal."

The number of new buildings contracted for in Chicago during April was 499, and their estimated cost $2,999,650, as compared with 371 new buildings contracted for in April, 1898, of an estimated cost of $1,329,500.

What will be the largest cotton mill in the South, now being erected at Columbia, S. C., is to be a thoroughly modern establishment, even to being run by electricity. The mill will have over 100,000 spindles and 3000 looms.

The Iron Age.

New York, Thursday, May 25, 1899.

DAVID WILLIAMS COMPANY, - - - - - - PUBLISHERS.
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GEO. W. COPE, - - - - - - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - BUSINESS MANAGER.

The Lake Ore Supply.

There is just now a discussion among men whose opinions have, and deserve to have, the greatest weight, of the question of the future of iron ore supplies, as they affect those dependent on the Lake Superior region. Opinions more or less alarmist have been given, and in the minds of many there is an evident fear that the whole fabric of the steel making trade is in danger of falling from a dearth of raw material, and the sceptre passing into hands that know not to-day's chief seats of industry. A glance at the statistics of the mining industry, a recognition of the fact that consumption is progressing to-day at the rate of 15,000,000 tons a year, a realization of the meaning of the gashed hillsides, the sunken caves, the barren ore hills of the lake district, might lead to agreement with these ideas and the conclusion that this fear for the future was not only well founded, but immediate.

But there is another side to the picture. In 43 years 134,000,000 tons have been shipped from the lake region, and of this 52,000,000 have come from the Marquette range. Notwithstanding this tremendous output that range last year made its chief shipment, and will this year follow with an aggregate perhaps even larger. Of course many mines have been exhausted, others are nearly so, and from many the ores of good grade have been succeeded by those of less value, but the fact remains that close to the first openings of 1854 new lenses are now being discovered, big mines have better underground outlooks than they have ever had, very considerable areas of promising ground are yet to be explored, and new metallurgical processes are bringing into use ores that have been overlooked.

On other and newer ranges there is more room for exploration than on the Marquette, and this exploration is now under way at a pace that is scarcely realized by those that have not followed it closely. The advance in ore values and the increased demands have had a wonderful effect in stimulating exploration, and these have had important results already, while there is no reason to doubt they are but a beginning. Further advances in price will put still more prospectors in the fields, and the search will be more carefully and scientifically directed, with a probability of even greater results than heretofore. There is mile after mile of unexplored though presumably valuable mineral land on more than one lake iron ore range, and group after group of properties whose ore limits have never been tested.

Last year there were 14 shipping mines on the Marquette range, 17 on the Menominee, 15 on the Gogebic, 3 on the Vermillion and 20 on the Mesaba; 69 in all. Who will be willing to deny that if the present conditions continue another year there will be less than 100 shipping properties on the five ranges before the close of 1900? There will be nearly that many this season, and the boom did not strike the mines till so late that it will take hustling to get any mine into shape for the summer. Last year's Vermillion output was 1,265,000 tons; this year's will be 50 per cent. greater. But there will be shown up on that range alone by the close of the present season almost double the ore reserves there were a year ago. No authority under the heavens can foretell what stores of ore may be found on the 50 miles of unexplored length of that range by the time more is needed. The history of the lake regions is full of instances of mines that were supposed to have become exhausted, but that by more skilled direction renewed their lease of life and became prosperous. It is also full, of course, of worked out and abandoned properties. The probability is that the chapter of such renewals has not been closed. And while every one has its unexplored territory, the five present ranges are not the whole of the Lake Superior country, and in that wonderful region of mineral bearing rocks there are more than a few iron ore lenses that give promise, while many a thousand square mile of well located territory has never been prospected.

Aside from the variety and richness of its ores, the prominence of the Lake Superior district has risen from its water borne transportation, and every cheapening in the cost of lake carriage and every improvement in handling ores and quickness of service has resulted in the building of greater works in the steel making districts of Lake Erie and the Central West. It is not supposable for an instant that the consumption of lake ores, risen in the past few years from an insignificant volume to the total of 15,000,000 tons annually, will rest at its present tonnage, but with further extension of demand, more improvements in transportation interests and still greater power in the manufacturing districts, the call on lake mines will rise, and it is not far to the time when these ranges will face an annual demand for 20,000,000 tons. Ultimately, of course, such a demand must cause failure, and before long it will necessitate the shipment from the lakes of classes of ore that are now thrown aside. It is safe to say that in a few years a 50 per cent. or poorer ore will be readily taken from the Mesaba, and no scoffing at the statement will change the fact. It is as idle to estimate how much additional tonnage this letting down of the bars will bring into the market as it is to-day to estimate how much ore there is on that or any other of the younger ranges.

When the pioneers of Northern Wisconsin found the Gogebic and the Tower interests opened the Vermillion it was on the eve of what many men in the trade called a famine in ore, and yet note the fact that the two ranges then in active existence—Marquette and Menominee—have since that impending famine sent down more ore by 2,000,000 tons than the Gogebic and Vermillion combined in all their history. Again, when the discovery of the Mesaba in all its vastness led to the extravagant statements of its future, the attention of the public was once more called to an impending famine in ore, which the recent openings on the Gogebic and Vermillion had but delayed a few years, and that an all wise Providence had forever dispelled by directing the course of a high wind at Biwabik. Since 1884, when the first shipments were made from Gogebic and Vermillion, the two older ranges have shipped more ore by 3,000,000 tons than all the three newer ones, whose discovery was said to save us from a calamity immediately impending. Not only this, but were the Mesaba eliminated from the entire argument the four old ranges would to day

have shipped but 17,000,000 tons more than they have to have furnished a full supply. Who can say that such an added spur would, in view of increased explorations that would have taken place, appreciably diminish their reserves of ore?

There will come a time, to be sure, when the whistle will call no more miners to their daily toil in the hills of the Lake Superior country, when the ground will no more sink to fill the space robbed of its mineral, when the rumbling ore trains will be idle and the cavernous ships in some other employment, but the men who to-day direct affairs need borrow no trouble for their own lifetime.

Reduction of Expenses by Consolidations.

The consolidations are accomplishing a great change in the iron trade. They are rapidly wiping out sales agencies and reducing the number of branch offices. This is noticeable in every large city and in many of the smaller ones. The number of persons engaged in business as manufacturers' agents is appreciably smaller, and will be still smaller in a short time, as the policy of concentration and central management becomes still more developed. The day of the agent is passing, just as the day of the broker passed not many years since. The iron broker was once an important factor in the trade, wielding a great deal of influence in shaping prices, and especially in shaping prices downward. He flourished when values were high and margins were wide, so that good commissions could be paid for business. But as competition increased and profits dwindled commissions were reduced until the brokerage business no longer presented inducements to continue in it. Brokers became direct agents for specific works or sought other fields of activity. Many manufacturers' agents are now dropping out of the ranks by the operations of new methods of transacting business, and thus the change goes on.

It is sad to note the disappearance from the trade of so many men of ability and long experience, whose qualifications are of a special character not fitted for any other line of business. To them are to be added traveling salesmen, whose wide acquaintance and commercial training had given their services high market value, which is an intangible asset. It cannot be made to produce a satisfactory income in a new channel unless the man is comparatively young and of sufficiently versatile genius to be able to quickly adjust himself to the conditions and usages of another line of trade. Thus the individual manufacturer is by no means the only one who passes out of the ken of customers long accustomed to dealing with certain houses. A great procession of other men who fancied themselves well placed for life is moving into oblivion so far as their regular trade is concerned. The reduction of expenses by concentration, which was at the beginning of this movement regarded with incredulity, is shown to be an accomplished fact by the number of high salaried agents, salesmen and other employees who have been thrown out of employment. As their earnings were paid by manufacturers, it follows that a very great saving must be accomplished by cutting them off the pay roll, as well as by cutting down the expenses involved in the maintenance of branch offices and the payment of traveling expenses. The percentage of cost in marketing goods is thus being reduced to a point which will be best appreciated by these large manufacturing interests when a period of depression again sets in. But the process by which this is being accomplished is a distressing fact in many homes.

Steel rail makers report that conditions are decidedly favoring the use of standard sections of their product. With the market in their favor, and a general difficulty in providing for prompt delivery, buyers of small lots find it decidedly to their advantage to waive the demand for special sections. They are beginning to realize that they are the ones who must pay for whims. Situated as they are, the rail mills cannot afford to restrict tonnage, even if they are paid for the cost of turning rolls for a section which has minor and really unimportant variations from a recognized standard. The sections adopted by the special committee of the American Society of Civil Engineers are gaining ground in this way, and the success thus attained is ample proof of the thorough and able manner in which this important work has been carried out.

OBITUARY.

S. B. STRANG.

S. B. Strang of Chattanooga, Tenn., died on April 26, of heart disease, at Cripple Creek, Col., aged 54 years. He was born at Elmira, N. Y., and in 1868 went to Chattanooga with General Elwell of Cleveland, Ohio. With General Elwell, Abram S. Hewitt and others he organized the original Roane Iron Company and built the furnaces and other works at Chattanooga and Rockwood, Tenn. Mr. Strang remained in the company in various capacities until 1882, when the concern were turned over to the present stockholders.

CHARLES L. HILL.

Charles L. Hill, president of the Bridgeport Chain Company of Bridgeport, Conn., died on May 20, in Brooklyn, N. Y., aged 62 years. He was born at Goshen, Conn., and was at one time connected with the Ansonia Slate Works of Ansonia, Conn.

JOHN H. MOORE.

In the death, on May 8, at Portland, Ore., of John H. Moore, one of the earliest pioneers of the Northwest passed away. He was a native of Northfield, Mass., where he was born 77 years ago. In 1851 Mr. Moore went to California, but removed to Oregon in 1857, settling on a donation land claim near Oregon City. He operated a machine shop in Oregon City for a number of years and also in Salem, Ore., where he was a member of the firm of B. F. Drake & Co. He was also for a time machinist for the Oregon Steam Navigation Company. For several years he conducted a machine shop at Portland.

E. Y. PERRY.

Edward Y. Perry a pioneer tack manufacturer, died on May 6, at his home in South Hanover, Mass., aged 87 years. He was born at Hanson, Mass., of Revolutionary parentage, and when quite a young man engaged in the manufacture of tacks at Hanover, a business which he gradually built up into one of the largest of its kind in the country. He bought the property of the Hanover Forge Company in South Hanover, and in conjunction with Ezra Phillips and Martin W. Stetson, formed the firm of E. Y. Perry & Co. Mr. Perry was also interested in a number of other business enterprises.

JAMES S. NEWELL.

James S. Newell of Newton Centre, Mass., died on May 14, at Covina, Cal., where he had gone for the benefit of his health. Mr. Newell was born at Warren, Mass., 75 years ago, and for many years was engaged in business in Boston as a mechanical engineer and manufacturer of special machinery.

JAMES SEMPLE.

James Semple, aged 29 years, assistant superintendent of the Lucy furnaces of the Carnegie Steel Company, Limited, at Pittsburgh, died at his home last week from injuries received at the furnaces the week before. While superintending repairs at one of the stacks Mr. Semple was overcome by gas and fell to the ground, a distance of some 20 feet, striking on his head and fracturing his skull. He had been connected with the Lucy furnaces for about 11 years, and by his merit as an engineer and machinist won promotion to the position of assistant superintendent of the Lucy furnaces, receiving his appointment only a short time ago.

Our Iron and Steel Production in 1898.

The admirable statistical report compiled annually by James M. Swank, general manager of the American Iron and Steel Association, has just been issued. Some of the figures Mr. Swank sends out earlier in the year, as the totals are available. This has been the case this year with pig iron, Bessemer and open hearth ingots and wire rods. Since they were printed in earlier issues of *The Iron Age* we need only refer to them incidentally.

Production of Pig Iron.

The following table, however, summarizes well the fluctuations in the output for a series of years semi-annually:

Years—Gross tons.	First half.	Second half.	Total.
1890	4,560,513	4,642,190	9,202,703
1891	3,368,107	4,911,763	8,279,870
1892	4,769,683	4,387,317	9,157,000
1893	4,562,918	2,561,584	7,124,502
1894	2,717,983	3,939,405	6,657,388
1895	4,087,558	5,358,750	9,446,308
1896	4,976,236	3,646,891	8,623,127
1897	4,403,476	5,249,204	9,652,680
1898	5,869,703	5,904,231	11,773,934

Comsumption of Pig Iron.

Our consumption of pig iron in the last five years is approximately shown in the following table, in gross tons, the comparatively small quantity of foreign pig iron held in bonded warehouses not being considered. Warrant stocks are included.

Pig Iron. Gross tons.	1895.	1896.	1897.	1898.
Domestic production	9,446,308	8,623,127	9,652,680	11,773,934
Imported	53,232	56,272	19,212	25,137
Stocks on hand January 1	661,328	506,132	847,686	874,978
Total supply	10,160,868	9,185,531	10,519,578	12,674,049
Deduct stocks December 31	506,132	847,686	874,978	415,333
Also exports	26,164	62,071	262,686	253,057
Approximate consumption	9,628,572	8,275,774	9,381,914	12,005,659

It appears from this table that our consumption of pig iron in 1898 averaged a little over 1,000,000 tons per month.

Production of Steel.

For a series of years the production of steel was as follows:

Steel Ingots.

	1894. Gross tons.	1895. Gross tons.	1896. Gross tons.	1897. Gross tons.	1898. Gross tons.
Bessemer Steel	3,571,313	4,909,128	3,919,906	5,475,315	6,609,017
Open Hearth Steel	784,936	1,137,182	1,298,700	1,608,671	2,230,292
Crucible Steel	51,702	67,666	60,689	69,959	89,747
Miscellaneous	4,081	858	2,394	3,012	3,801
Total	4,412,032	6,114,834	5,281,689	7,156,957	8,932,857

Production of Iron and Steel Structural Shapes.

Our statistics of iron and steel structural shapes embrace the production of beams, beam girders, zee bars, tees, channels, angles and other structural forms, but they do not include plate girders made from plates. Plates are provided for under other classifications, and under the general statistics of plates are included all plates cut to specifications. Nearly all the structural shapes and plates used for structural purposes are made of steel. The total production in 1897 and 1898 by States was as follows:

States—Gross tons.	1897.	1898.
New England, New York and New Jersey	20,785	27,919
Pennsylvania	538,055	641,726
Kentucky and Alabama	2,384	3,588
Ohio	13,629	21,233
Colorado and California	8,937	7,731
Total	583,790	702,197

The increased production of structural shapes in 1898 as compared with 1897 was 118,407 gross tons, or over 20 per cent. Pennsylvania made over 91 per cent. of the total production in 1898, New Jersey almost 4 per cent. and Ohio over 3 per cent. No other State made over 1.5 per cent. The total production of structural shapes in 1897 was 583,790 tons, in 1896 it was 495,571 tons and in 1895 it was 517,920 tons.

Production of Plates and Sheets.

The production of plate and sheet iron and steel in the United States in 1898, excluding nail plate, amounted to 1,448,301 gross tons, against 1,207,286 tons in 1897, 965,776 tons in 1896, 991,459 tons in 1895, 682,900 tons in 1894, 674,345 tons in 1893, and 751,460 tons in 1892. Skelp iron and steel are not included in our tables with plates and sheets but with other rolled products.

The following table gives the production of iron and steel plates and sheets, by States, not including nail plate, in 1898, in gross tons. In 1894, at the request of the manufacturers, we separated plates and sheets by gauges, observing the following classification: Plates, up to No. 8 inclusive; firebed, Nos. 9 to 19 inclusive; sheets, Nos. 20 to 25 inclusive, and No. 26 and thinner gauges. This classification was continued until 1898, in which year the classification given in the following table was adopted. The production by gauges in 1898 was as follows, as nearly as can be determined from the returns made to us:

States. Gross tons.	Up to No. 8 inclusive.	No. 9 to No. 17 inclusive.	No. 18 and thinner.	Total. Gross tons
New England	.....	243	.....	243
New York and New Jersey	2,110	.....	1,000	3,110
Pennsylvania	522,851	79,841	315,718	918,410
Delaware and Maryland	1,600	552	19,111	21,263
West Virginia	67	2,650	30,247	32,964
Kentucky and Alabama	8,350	5,713	14,650	28,713
Ohio	33,397	21,907	201,129	256,433
Indiana, Illinois, and Missouri	70,486	6,599	110,080	187,165
Total	638,861	117,505	691,935	1,488,301

The production of "black plates for tinning" alone in 1898 is reported to us to have amounted to 345,254 gross tons, against 271,886 tons in 1897, an increase of 73,368 tons, or almost 27 per cent. Of the production in 1898 Pennsylvania made 149,562 tons; Indiana, 80,028 tons; Ohio, 77,788 tons, and Maryland, West Virginia, Kentucky, Illinois and Missouri, 37,876 tons. The production of "black plates for tinning" in 1896 was 185,387 tons, against 129,615 tons in 1895 and 52,359 tons in 1894.

Production of Wire Nails.

The production of iron and steel wire nails in the United States in 1898 amounted to 7,418,475 kegs of 100 pounds each, compared with 8,997,245 kegs in 1897, a decrease of 1,578,770 kegs, or over 17 per cent. In 1896 the production amounted to 4,719,860 kegs, in 1895 to 5,841,403 kegs, in 1894 to 5,681,801 kegs, and in 1893 to 5,095,945 kegs. The wire nails produced in 1898 were manufactured by 59 works, five less than were in operation in 1897. The following table gives the production of wire nails by States in 1897 and 1898, in kegs of 100 pounds:

States—Kegs.	1897.	1898.
Massachusetts, Rhode Island and Connecticut	160,662	126,253
New York and New Jersey	248,132	109,833
Pennsylvania	3,467,509	3,408,504
Maryland and West Virginia	15,100	5,000
Ohio	2,237,641	1,711,399
Indiana and Wisconsin	733,669	494,378
Illinois	1,993,547	1,394,981
Missouri, Kansas, Michigan, Washington and California	140,985	168,127
Total	8,997,245	7,418,475

It may be interesting to note in this connection that while the production of wire nails fell off in 1898 the output of wire rods increased from 970,736 gross tons in 1897 to 1,071,683 gross tons in 1898.

Production of Cut Nails.

Our statistics of the production of iron and steel cut nails and cut spikes in the United States do not embrace railroad and other spikes made from bar iron, wire nails

of any size, or machine made horseshoe nails. Cut spikes are included with cut nails.

The total production of cut nails in 1898 was 1,572,221 kegs of 100 pounds each, against 2,106,799 kegs in 1897, a decrease of 534,578 kegs, or over 25 per cent. In 1886 the maximum production of 8,160,973 kegs was reached. In 1898 the production of wire nails exceeded the production of cut nails by 5,846,254 kegs. In 1897 the wire nail production exceeded the cut nail production by 6,890,446 kegs.

Nine States made cut nails in 1898. The following table shows the production of iron and steel cut nails by States from 1893 to 1898, in kegs of 100 pounds. The wire nail production for the same years is added to the table:

States—Kegs.	1893.	1894.	1895.	1896.	1897.	1898.
Pennsylvania	1,113,168	1,061,931	938 865	646,011	1,057,964	768,171
Ohio	768 031	490,461	347,162	264,272	411,396	392,003
West Virginia	330,859	273,822	347,022	286,210	290,203	184,942
Indiana	177,648	125,000				
Massachusetts and New Jersey	337,039	166,350	161,888	137,005	142,021	127,706
Illinois	81,128	94,462	81,773	91,145	34,000	87,399
Maryland, Virginia and Ky	224,060	213,034	246,184	167,227	164,465	
Missouri, Col., Wyo. and Cal	17,000	.....	7,000	24,000	6,750	12,000
Total cut nails	3,048,933	2,425,060	2,129,894	1,615,870	2,106,799	1,572,221
Total wire nails	5,095,945	5,681,801	5,841,403	4,719,860	8,997,245	7,418,475
Grand total	8,144,878	8,106,861	7,971,297	6,335,730	11,104,044	8,990,696

The Wheeling district embraces the nail mills in Ohio and Marshall counties in West Virginia, and in Belmont and Jefferson counties in Ohio. There were 282,908 kegs of cut nails made in this district in 1898, against 292,950 kegs in 1897, 305,881 kegs in 1896, 347,742 kegs in 1895, 416,329 kegs in 1894, 1,848,116 kegs in 1887, and 1,858,551 kegs in 1886. Allegheny County, Pennsylvania, which has not made any cut nails since 1890, is now a large producer of wire nails. Massachusetts, once a large producer of cut nails, now makes few cut nails but produces considerable quantities of wire nails.

Total Production of All Rolled Iron and Steel.

By the phrase rolled iron and steel we include all iron and steel rolled into finished forms, as follows: 1, All sizes of iron and steel rails; 2, plate and sheet iron and steel; 3, iron and steel plates for cut nails and cut spikes; 4, wire rods; 5, iron and steel structural shapes; 6, bar, bolt, hoop, skelp and rolled axles. Hammered axles and other forgings are not included, nor muck bars, billets and tin plate and sheet bars.

The production of all iron and steel rolled into finished forms in the United States in 1898 was 8,513,370 gross tons, against 7,001,728 tons in 1897, an increase of 1,511,642 tons, or over 21 per cent. Twenty-seven States rolled either iron or steel or both iron and steel in 1898, one more than in 1897. The following table gives the total production by States of iron and steel rolled into all kinds of finished forms in 1897 and 1898, in gross tons:

States—Gross tons.	1897.	1898.
Maine and New Hampshire	2,519	3,751
Massachusetts	94,319	104,221
Rhode Island and Connecticut	30,233	42,158
New York	81,283	83,735
New Jersey	86,421	98,281
Pennsylvania	3,956,727	4,622,770
Delaware	43,982	45,973
Maryland	82,926	149,820
Virginia	26,482	34,497
West Virginia	151,424	198,833
Kentucky	30,968	39,239
Tennessee and Georgia	9,940	10,621
Alabama	37,763	59,897
Ohio	1,017,124	1,231,739
Indiana	254,376	352,058
Illinois	863,013	1,071,327
Michigan, Wisconsin and Minnesota	136,016	192,281
Missouri	35,505	32,526
Kansas	.....	9,940
Colorado	22,710	99,050
Wyoming, Washington, Oregon and California	37,997	30,653
Total	7,001,728	8,513,370

Pennsylvania made 54.3 per cent. of the total production of rolled iron and steel in 1898, against 56.5 per cent. in 1897; Ohio made 14.4 per cent. in 1898, against 14.5 per cent. in 1897; Illinois made 12.5 per cent. in 1898, against 12.3 per cent. in 1897, and Indiana made 4.1 per cent. in 1898, against 3.6 per cent. in 1897.

It has been impossible in late years to separate rolled iron from rolled steel, but the fact is worthy of mention that the use of puddled iron in this country is now increasing.

Production of Allegheny County, Pennsylvania.

The following table gives the number of blast furnaces, rolling mills and steel works and the production in gross tons of pig iron and crude steel and of iron and steel rolled into finished forms in Allegheny County, Pennsylvania, in 1896, 1897 and 1898:

Details—Gross tons.	1896.	1897.	1898.
Blast furnaces, number	28	30	30
Production of pig iron, tons	2,061,269	2,663,093	3,022,901
Rolling mills and steel works, number	64	61	60
Production of Bessemer steel, tons	1,608,321	2,061,837	2,338,087
Production of open-hearth steel, tons	569,680	725,262	1,042,350
Production of crucible and other steel, tons	33,596	42,231	52,352
Total production of steel, tons	2,211,597	2,829,330	3,432,789
Production of rails, bars, bolts, rods, shapes, hoops, skelp, &c., tons	1,350,886	1,797,064	2,091,503
Production of plates and sheets, tons	324,296	395,830	444,850
Total production of rolled iron and steel, tons	1,675,182	2,192,894	2,536,353

Allegheny County produced in 1898 over 25 per cent. of the total production of pig iron in the United States; over 35 per cent. of the total production of Bessemer steel ingots and castings; almost 46 per cent. of the total production of open hearth steel ingots and castings; over 58 per cent. of the total production of crucible steel; over 28 per cent. of the total production of Bessemer steel rails; over 64 per cent. of the total production of structural shapes; over 30 per cent. of the total production of plates and sheets, and almost 25 per cent. of the production of miscellaneous rolled products not enumerated above. Of the total production of all kinds of rolled iron and steel, including rails, Allegheny County made in 1898 over 29 per cent.

American Railway Equipment Company.

At the offices of the Illinois Trust & Savings Company subscription books were opened yesterday for the stock of the American Railway Equipment Company. The capital stock of the company is to be $22,000,000, divided into $10,000,000 preferred and $12,000,000 common.

Options have been received on the plants of the following companies: Chicago-Cleveland Car Roofing Company, Chicago; C. B. Hutchins & Sons, Detroit; P. H. Murphy & Sons Mfg. Company, St. Louis; Sargent Company, Chicago; Sheckless, Harrison & Howard Iron Company, St. Louis; American Brake Beam Company, Chicago; Chicago Railway Equipment Company, Chicago; Kewanee Mfg. Company, Jersey City; Sterlingworth Railway Supply Company, Easton, Pa.; Monarch Brake Beam Company, Detroit; National Railway Specialty Company, Chicago; McCord & Co., Chicago; McGuire Mfg. Company, Simplex Railway Appliance Company, Commonsense Bolster Company, Standard Truck Company, Cloud Steel Truck Company and the Q & C Company, Chicago.

It is expected that the officers will be elected and properties transferred about June 1. The directors which were named in the prospectus are J. E. French, New York; Henry B. Laughlin, Chicago; Willard A. Smith, Chicago; George B. Leighton, St. Louis; James H. Berry, Detroit; Charles H. Hutchinson, Detroit; W. V. Kelly, Charles F. Quincy, William J. Cook and E. B. Leigh, all of Chicago.

A Molders' Strike at Chicago.

(By Telegraph.)

CHICAGO, May 24, 1899.—The molders are striking at a number of the Chicago foundries for a 10 per cent. advance in wages, insisting on a minimum of $2.75 per day for floor or bench molding. A considerable number of foundries have already conceded the terms demanded, but others are holding out, and a prolonged contest is threatened.

With a capital of $1,000,000 the Atlantic Brass Company were recently incorporated under the laws of New Jersey, for the purpose of making journal bearings under the patents of Wm. B. Smith and others, which the company have purchased. The company state that they will not take over other companies but intend eventually manufacturing brass fittings of various descriptions. The directors and officers are: Austin Corbin and Wm. B. Smith of New York; Wm. A. Russell and J. M. Wheaton of Boston and Robert L. Green of Elizabeth, N. J. The president is Austin Corbin; the treasurer, Wm. A. Russell, and the general manager, Wm. B. Smith. The company have opened offices on the fourth floor, Corbin Building, 192 Broadway.

The New Machine Shop at the New York Navy Yard.

WASHINGTON, May 23, 1899.—The Bureau of Steam Engineering of the Navy Department has completed the tentative plans for the new plant to replace that recently destroyed by fire at the Brooklyn Navy Yard. The new shops will be a notable improvement upon the old ones and will embrace the latest devices in power transmission, heating, lighting and ventilating, and will also include the latest patterns of machine tools and appliances of every description. The new shops will be considerably larger than the old ones, but will be built upon practically the same grounds. The entire plant will be on the ground floor and little or no gallery space will be utilized. The machine shop proper will occupy the space on Morris avenue between Fifth and Sixth streets, having a frontage on the avenue of 350 x 130 feet, and will extend in the form of an L along Sixth street for a distance of 470 feet, the rear portion being designed for an erecting shop. A floor plate about 100 feet square will be installed for erecting and for heavy portable tools. The plans contemplate the massing of all the heavy tools in the front of the building, with special reference to the handling of work from one tool to another in the ordinary sequence of finishing. A section of the shop will be separated for the purpose of segregating all brass working tools, which will be conveniently arranged to save labor and unnecessary transportation of the work.

Along the Fifth street front and immediately adjoining the machine shop have been designed a boiler shop, smithery and copper shop, forming a second leg to the L of the machine shop and the quadrangle is practically completed by the location of a power house 80 x 100 feet between the extremities of the two legs. In the end of the court opposite to the power house a toolroom, a testroom and a lavatory are located, and in the middle of the court a series of latrines are to be placed.

The area of the buildings will be about 80,000 square feet, or a little less than 2 acres and the power house is the only separate structure. The boiler shop, smithery and copper shop will probably be thrown into one room without partitions. The machine shop is divided into three bays, two wing bays of 30 feet each and a central bay of 70 feet, the wing bays having a hight of 30 feet and the central bay of 62 feet. Special attention will be paid in the construction of these buildings to make them absolutely fire proof. No wood will be used in their construction, the walls and beams being of iron and steel and the roofs of wings, lavatory, test and tool rooms of ribbed glass. Glass will be freely used and doors and windows will be unusually large in order to secure the best possible lighting and ventilation. All main doors will be sliding or balanced for lifting.

The auxiliary buildings will be entirely separate from the main plant, the foundry occupying its position directly across Morris avenue in front of the machine shop, the administration building being located at the corner of Morris avenue and Sixth street and the pattern shop and storage buildings taking up a space of 205 x 60 feet and situated diagonally in the rear of the administration building. The drafting room will occupy a floor of the administration building and will be fitted with modern fire proof cases for the custody of drawings, records, &c.

Power Transmission.

Much study has been given to the question of supplying power to the tools and appliances of the new plant. Electricity will be used almost exclusively and will be provided by three 400 kilowatt two phase alternating generators. All tools requiring 5 horse-power or above for their operation will be fitted with separate electric motors. Tools requiring less than 5 horse-power will be operated in groups of 6 to 12, each group taking its power from a section of shafting driven by an electric motor. In operating these groups an innovation will be made in that the motors will be applied directly to the shafts and not geared or belted, as is usual. In connecting up the plant the tools most frequently used will be arranged to operate from a single generator, but a complete system of switches will be provided for use in emergencies. The power plant will probably have electrically operated pumps, but every possible contingency will be guarded against by the installation of a steam operated feed pump as an auxiliary. The air compressors will also be operated by electricity.

A complete system of cranes has been designed, having a capacity of from 5 to 40 tons each. They will all be electrically operated and will be so disposed as to handle expeditiously the particular classes of work upon which the plant will be chiefly engaged. Over the heavy tools there will be a 40-ton crane. In the L of the machine shop there will be a 25 ton crane and under these cranes there will be two others of 10 tons each. All these cranes will cover the central bay, and in the side bays there will be jib cranes of 5 tons capacity each. Four of these small cranes have been designed, but it is probable that one or two additional may be provided.

The problem of heating the buildings has been worked out by the use of exhaust steam, feed heaters being employed. Pressure of at least 160 pounds will be used in the boilers.

The lighting of the building will be accomplished by electricity and by a plant entirely independent of that used for power purposes; 25 cycle alternating generators will be employed, this type being regarded as best suited for slow speed motors.

Chief Engineer Melville, under whose direction these plans have been prepared, states that while tentative they will doubtless be adopted without material modification, and advertisements will be issued in the course of a few weeks calling for bids for the construction of the buildings and the supplying of their equipment. It has not yet been determined whether contracts will be let for the entire plant, including fittings, tools, &c., but an important consideration will be the length of time required to construct the buildings and provide their appliances.

W. L. C.

PERSONAL.

W. W. Rockhill, late United States Minister to Greece, has assumed the office of Director of the Bureau of American Republics, temporarily occupied by Frederick Emory, who returns to his post in the State Department as chief of the Bureau of Foreign Commerce.

J. E. Brandt, expert operator for the Jones & Lamson Machine Company, Springfield, Vt., has been appointed superintendent of the Standard Railway Equipment Company, St. Louis, Mo.

Frederick U. Adams, a man of ability and experience in such matters, has been appointed City Smoke Inspector of Chicago. Under the incumbent of the past two years the smoke nuisance in Chicago has become intolerable, and the promise of better things in this direction is most gratifying.

The Phœnix Bridge Company, Phœnixville, Pa., have received a contract from the Japanese Government to build a large steel bridge for the Imperial Railway of Japan. The bridge will be in six spans, 130 feet high, and will weigh something over 1,000,000 pounds. As soon as the plans are completed work will be commenced and the bridge will be ready to ship by September 1.

G. F. Greenwood, consulting engineer of the Consolidated Traction Company, at Pittsburgh, and until recently chief engineer and general manager, has been elected engineer in charge of the reconstruction of the lines of the Havana Electric Railway Company of Havana, Cuba. The change of the Havana system is one of the most important street railway undertakings of the year.

W. A. Magee, general sales agent of the H. C. Frick Coke Company, who has been on a Mediterranean trip for about four months, is expected in Pittsburgh this week.

Prof. Samuel P. Langley, secretary of the Smithsonian Institute, Washington, D. C., and Prof. Robert H. Thurston, director of the Sibley College of Cornell University, have been elected honorary members of the Royal Institution of Great Britain on the occasion of the centenary of that organization.

James Gayley, a member of the Board of Managers of the Carnegie Steel Company; D. McClemson, superintendent of the Carnegie Natural Gas Company; Geo. E. McCague, general freight agent of the Carnegie Steel Company; E. H. Utley, traffic manager of the Pittsbugh, Bessemer & Lake Erie Railroad, and Thomas Morrison, superintendent of the Edgar Thomson Steel Works, have gone to the ore regions on an inspection trip. They will inspect the new purchases recently made by the Oliver Iron Mining Company.

Laughlin & Co., Limited, operating the Eliza furnaces at Pittsburgh, have let a contract for 800 beehive coke ovens, to be built alongside the Eliza furnaces on Second avenue, in that city. The output of these ovens, together with the product of other ovens already in operation, will give Laughlin & Co., Limited, sufficient coke to run their five blast furnaces, which they will have in operation within a year. This concern are an identified interest of Jones & Laughlins, Limited, and their entire product of pig will be used by that concern.

One of the largest natural gas strikes in years was made this week on a farm at Tiffin, Ohio. The yield is reported to be over 500,000 feet a day.

The Sheet and Tin Plate Scales.

(By Telegraph.)

PITTSBURGH, PA., May 24, 1899.—From Detroit, where the sessions of the Amalgamated Association are being held, comes the announcement that the tin plate scale for the year beginning July 1, which had been fixed at 9.1 per cent. advance over the present scale, has been reconsidered and a new scale adopted, calling for a straight advance of 20 per cent. The basis of the new scale is as follows: When a box of 100 pounds of tin plate is selling at a ratio of one-seventh the price per ton of 2000 pounds, Bessemer steel bars, the wage list as given below shall be paid. But in case of a departure in either the selling price of bars per ton or of 20 boxes 100 pounds tin plates, which will change the above ratio in favor of the manufacturer to the amount of $2 per ton or more, then the wages shall advance 5 per cent. for each $2 from said ratio, and decline 5 per cent. for each $2 decline to said ratio. It is understood that the wage list given below is the minimum for the year ending June 30, 1900.

The straight advance of 20 per cent. in the base wage rate will give the following tonnage rates for the various positions on the lowest gauges: Nos. 8 to 11 rolling steel, $2.44; doubling, $1.12; heating, $1.02; shearing on jaw or crocodile shears and job or sheet work on squaring shears, $1.30, and shearing tin plate on squaring shears, 43 cents. All other rates are also a straight 20 per cent. advance on last year's rates.

The foot notes are changed as follows: Clause 7 is revised to read: Where improved squaring shears are used the company shall pay for opening and grinding the knives, and on jaw and crocodile shears the company to pay for opening, and all sheets sheared below 14 x 20 shall be paid for at the rate of 50 cents per every one pair, and all sheets sheared below 14 x 20 shall be paid for at the rate of 50 cents per turn extra.

Five new clauses are added:

Clause 11. The weight of bar be marked on the bar when brought to the mill.

Clause 12. In each tin mill a blackboard shall be furnished on which the weight of each turn shall be placed within a reasonable time after being made.

Clause 13. That shearmen on modern squaring shears in the tin mills be paid the scale price in full, no matter what way the packs are fed to the shears.

Clause 14. That catchers in tin plate mills be supplied with swabs by the company, or material to make them.

Clause 15. That United States Standard gauge be enforced in its entirety, including the variation of 2½ per cent.

On Tuesday morning, May 23, the sheet mill scale was arranged. This is based on the selling price of Nos. 26, 27 and 28 gauge of 2.5 cents per pound minimum, and with every advance of 1-10 cent in price of sheets the wage scale advances 2 per cent. This basis remains the same, and the new rates for rolling iron per ton on the various gauges are as follows: No. 8 and heavier, $3.60; Nos. 9 to 11, $4; Nos. 12 to 14, $4.80; Nos. 15 to 17, $5.55; Nos. 18 to 21, $6.75; Nos. 22 to 24, $8; Nos. 25 to 26, $9.20; No. 27, $10; No. 28, $10.65; No. 29, $11.15; No. 30, $12. Prices for rolling steel, beginning at gauge Nos. 22 to 24 as the base, at a rate of $8.80 a ton, are as follows: Nos. 25 to 26, $10.12; No. 27, $11; No. 28, $11.71; No. 29, $12.30, and No. 30, $13.20. The balance of the scale remains the same with this proviso.

Proviso: "These rates are to apply only to jobbing mills rolling No. 18 and heavier over 43 inches in width."

The foot notes remain precisely the same, with these additions: Clause No. 23, "The company agrees to furnish on all sheet and jobbing mills a pair of scales suitable to weigh sheet bar, said scales to be placed convenient to said mill."

Clause 24, that the roller be paid $2 for changing rolls. This latter clause is of considerable importance.

The rates for sheet mill day hands are as follows on single mill: Pair heating, per day, $2.58; matching, $2.30. On double mill: Pair heating, per day, $2.30; doubling, $2.01, matching, $2.12. Large jobbing mills, when working over 50-inch rolls: Pair heater, per day, $2.58; to matchers, each $2.30; second catcher, $2.30. Small double mill: Pair heating, per day, $2.12; matching, $1.84; doubling, $1.72.

The foot notes remain the same, with these exceptions:

To clause 12 there is added: "A single slab shall be equivalent to one pair of single sheet iron, and a double slab shall be equivalent to one pair of double sheet iron."

Clause 16 has been simplified to read: "It is agreed that no more than three changes in the classification of any sheet or jobing mill can be made during the scale year."

On Thursday, May 25, a meeting will be held in Detroit between President Shaffer of the Amalgamated Association and James H. Nutt, representing the Manufacturers' Association of Youngstown, and committees will be appointed to take up the wage scales for bar iron mills. It is desired to arrange the bar iron scales as soon as possible, so that there will be no interruption of work.

JOSEPH SIDNEY SEAMAN,
President of the American Foundrymen's Association.

The New President of the American Foundrymen's Association.

Joseph Sidney Seaman, who was elected president of the American Foundrymen's Association, and whose portrait we present herewith, was born in Butler County, Pa., on April 14, 1839. Mr. Seaman received his education in the public schools at Butler and in Connoquenessing Academy. His business career commenced at the age of 17, when he came to Pittsburgh and learned the trade of roll turner, working for a considerable time for the A. Garrison Foundry Company, in Pittsburgh. He commenced the foundry business in 1870 with Bollmann, Baggeley & Co., of which firm James B. Young was the successor, this concern being succeeded by Seaman, Sleeth & Co., and the latter in 1896 by the Seaman-Sleeth Company, a corporation of which Mr. Seaman is president.

MANUFACTURING.

Iron and Steel.

The rod and angle iron mill, at Cregan Station, Chicago, Ill., belonging to the Garden City Wire & Spring Company, was totally destroyed by fire last week, the loss being fully covered by insurance. The company expect to rebuild this mill immediately, putting up a building of steel construction throughout, and, in addition, expect to increase their output considerably, so that on its completion they will be in a better position to supply their trade than heretofore.

The Midvale Steel Company of Philadelphia, Pa., contemplate the erection of a large open hearth steel plant and of a large forge shop.

The plant of the Eureka Steel Casting Company, at Chester, Pa., which has been bought by leading men in the Pennsylvania Steel and Maryland Steel companies, is being put in condition to run, and it is expected to be in operation in about two weeks' time. The Solid Steel Casting Company, recently organized, will operate the plant.

The rumor that the Pennsylvania Car Wheel Company, Pittsburgh, Pa., have sold out is authoritatively denied. In order to enlarge their business additional property has this year been taken in, and the capital stock increased from $100,000 to $200,000, paid in. It is possible that these changes have given rise to the rumor.

The Jacoby Foundry & Machine Company of Moberly, Mo., have been incorporated, with a capital stock of $20,000, by F. C. Jacoby, W. W. Jacoby and H. G. Crake.

It is stated that some New Castle capitalists, including Wm. Bonater and C. W. Watson, are negotiating for a lease of the plant of the Greensburg Steel Company, at Greensburg, Pa., which has been idle for a long time.

Samuel Severance, who for many years has conducted a plant on Water street, Pittsburgh, in the manufacture of spikes and bolts, has decided to locate at Glassport, Pa., and will build a new and much larger plant at that place. The main structure will be 100 x 300 feet, together with several smaller buildings. The building vacated by Mr. Severance has been leased by Heyl & Patterson, manufacturers of conveying machinery.

The Keystone Rolling Mill, at Pittsburgh, which has been idle for several years, was started up on Monday, May 22. The output will be muck bar and skelp. The plant is owned by the estate of James McCutcheon.

The old Morehead-McCleane plate mill at Pittsburgh, which was recently bought by Jones & Laughlins, Limited, has been put in operation, after an idleness of some years. This plant is equipped to roll plates up to 84 inches wide. Soho Furnace, also belonging to the same plant, and which has been operated for two years under lease by Jones & Laughlins, Limited, has also been bought by that concern. It will be remodeled to conform to the new Elisa furnaces of Laughlins & Co., and will have a daily capacity of about 600 tons.

The American Tin Plate Company are adding one more mill to the Pittsburgh Tin Plate Works, at New Kensington, Pa., making it a seven mill plant.

A consolidation of Southern steel, iron and railroad interests, with a capital of $15,000,000, has been practically completed. The properties included are furnaces at Johnson City and Embreeville, Tenn.; the Carter Coal & Iron Company, Pulaski, Va.; Pulaski Iron Company of Pulaski, Va.; Crozer Iron Company, Roanoke, Va.; Consolidated Coal & Iron Company, Max Meadows, Va.; Salem Iron Works, Salem, Va.; Graham Furnaces, Graham, Va.; Home Iron Company, Bristol, Tenn.

The rolling mills of the Brown-Bonnell Iron Company, the Mahoning Valley Iron Company and the Andrews Brothers Company, all of Youngstown, Ohio, were formally transferred to the Republic Iron & Steel Company last week.

The Executive Committee of the Republic Iron & Steel Company have appointed James A. Campbell as district manager of the three plants of that company located at Youngstown, Ohio, together with the mills of the Atlantic Iron & Steel Company, at New Castle, Pa., and the Sharon Iron Company, Limited, at Sharon, Pa. The five mills in question will be financed in Youngstown, and will hereafter be known as the Valley Works, the Brown-Bonnell Works, the Andrews Works, the Atlantic Works and the Sharon Works.

It is stated that the project to build new sheet mills by the Coshocton Iron & Steel Company, at Coshocton, Ohio, has not been abandoned. The principal parties interested are J. M. Ogier, Jas. McMahon, M. D. Flaherty, all of Cambridge, Ohio, and L. T. Jack of Dresden, Ohio. An extension of time on the bonus has been granted by the Coshocton Board of Trade. Further action relating to this plant will probably depend upon the course taken by the consolidations made in the iron trade.

Machinery.

Farmer Mfg. Company, Hartford, Conn., have been incorporated under the laws of Connecticut to manufacture A. J. Farmer's combination lathe and grinding tool. They will also make a specialty of tool, model, experimental, punch and die, sheet metal work and wire bending machinery. They are located at 65 Suffield street, Hartford, and their factory is in complete operation.

The Prox & Brinkman Mfg. Company, successors to Frank Prox and Phœnix Foundry & Machine Works, Terre Haute, Ind., have just added a new foundry building in which a 15-ton crane has been installed. They have also placed in their shops a number of air cranes and pneumatic tools. They are crowded with work to their fullest capacity, and have under way the development of some special machinery. Their pipe department and foundry is being operated ten hours, while their machine shop is running 24 hours. Among recent shipments were several extra large hoisting engines to the Michigan coal fields.

The American Car & Foundry Company are building a new foundry as an addition to their Wells & French plant, Chicago.

C. A. Stickney, St. Paul, Minn., has completed plans for the building of a factory for making gasoline engines. The building will be located on the block at Fillmore and Fairfield avenues and Custer and Starkey streets, be 50 x 150 feet, two stories high and constructed of brick at a cost of about $10,000. Thirty people will be employed at the start, and it is expected that the factory will be in operation by September 1. The gasoline engines to be manufactured are of a new pattern designed by Mr. Stickney.

Moran Bros. Company, Seattle, Wash., have made plans to greatly extend their business. They will add largely to the equipment of their machine shop, and will build a floating dry dock of large capacity. They will purchase machine tools for the heaviest class of work.

The National Grate Bar Company, with principal office at 239 Washington street, Jersey City, have been incorporated to manufacture grate bars, fire brick, &c., with a capital of $250,000. The incorporators are George S. Lee, Hawthorne, N. J.; George V. Sheffield, Pompton Lakes, N. J.; William P. Martin, Newark, N. J.

The Standard Motor Mfg. Company of Glen Cove, L. I., have been incorporated, with a capital of $150,000, to manufacture mechanical motors, and to manufacture and equip boats and self propelling vehicles of all kinds. The directors are Frederick C. Penfield, Carl C. Riotte, Augustus T. Gillender, Carlton R. Radcliffe and Edward Swan of New York City.

The Ft. Wayne *Sentinel* states that the Standard Wheel Company's plant, at Ft. Wayne, Ind., has been sold to John H. Bass, the consideration being $40,000. The wheel company have not operated the Ft. Wayne factory for several years, and Mr. Bass bought the property that he might enlarge his foundry and machine business.

The Atlantic Brass Company of Jersey City, N. J., have been incorporated, with a capital of $1,000,000, to make car axle bearings and other railroad supplies. The incorporators are Scott McLanahan, Charles M. Reynolds, Henry Meyers, Robert S. Green, Charles H. Burke.

The McCormick Bros.' Iron Works of San Francisco, Cal., have been incorporated, with a capital of $20,000, to do a machinery and general foundry business. Thos. A. McCormick, John McCormick, Wm. H. McCormick, Edward O'Neil and J. A. McCormick are the directors.

The Grant Machine Tool Works, Cleveland, Ohio, are building some special watch machinery, in one of their departments, for the Elgin National Watch Company, Elgin, Ill. They have recently brought out a machine for automatically cutting worm gears from 2 to 20 inches in diameter. Their new 44-inch turret turning and chucking machine is attracting considerable attention among engine builders and others having heavy face plate and forming work to do. This machine is well adapted for turning dies for rubber tire manufacturers, decreasing the time of turning one-half over the present method.

Among recent incorporations in California is that of the Climax Mfg. Company of San Francisco, with a capital of $30,000, to manufacture machinery. The incorporators are F. T. Leilich, E. A. Heissler, J. G. Simonton, A. J. Hart, T. Trenor, W. M. Millett, B. Vale, all San Francisco, and E. F. Murdoch, Oakland.

Sterne Brothers Company of San Diego, Cal., machinists and foundrymen, have been incorporated, with a capital of $20,000. The incorporators being C. E. Sterne, I. C. Sterne, S. L. Davis and R. Davis of San Diego, W. E. Sterne and M. E. Sterne of Topeka, Kan.

The Stillwell-Bierce & Smith-Vaile Company, Dayton, Ohio, advise us that they have established a branch office at room 601, Burlington Building, St. Louis, Mo., in order to insure quick service to patrons in St. Louis territory. Louis Bendit has been appointed manager for the district, and it is the intention to carry in St. Louis a full line of standard size steam pumps and automatic feed pumps and receivers, and in addition some of the other well-known specialties made by this company. It is announced that this concern have no connection with other manufacturers, but operate on their own responsibility, and without the restriction of a combination.

The Bradford Lathe Company, Cincinnati, Ohio, since January 1 have installed some $10,000 worth of new machine tools in their plant, especially adapted for the production of the Bradford lathe, so that they are now in position to put through at one time over 50 lathes in lots.

The J. A. Fay & Egan Company, Cincinnati, Ohio, have just closed a contract with Miller & McCromby of Montrose, Scotland, for $50,000 worth of saw and planing mill machinery for installation in what will probably be the largest saw mill plant in America, near Quebec. The total cost will approximate $700,000.

The Sheffield Car Company of Three Rivers, Mich., are about to engage in a new branch, that of manufacturing electrical dynamos and motors.

The Miller Press & Machine Company of Woonsocket, R. I., have been incorporated with a capital stock of $20,000. The incorporators are George W. Miller, Sr., John J. Miller, George W. Miller, Jr., and Fred L. Miller. The company are formed for the purpose of manufacturing and dealing in cotton and woolen machinery.

The B. & D. Pick Mfg. Company, San Francisco, Cal., have been incorporated with a capital of $100,000 by S. Bishop, W. Drury, M. E. Van Meter and others.

The Peru Steel Casting Company of Peru, Ind., capital $400,000, have filed articles of incorporation. Geo. A. Swartout, W. J. Cooke and C. L. Sullivan are the incorporators.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, manufacturers of light and heavy machinery castings, sand and chilled rolls, have purchased a plot of ground, 100 feet square, adjacent to their present works, and in the fall will erect a machine shop of the full dimensions of the property. This concern expect to equip themselves for the manufacture of tin plate machinery. They are running their works to utmost capacity in every department, and have orders ahead for three or four months.

Bridges.

The County Commissioners voted to erect a new bridge across the Mississippi River, at Sauk Rapids, Minn. The new structure at a rough estimate will cost $12,500.

It is announced that the Minneapolis & St. Louis has let the contracts for five iron bridges along the line of its proposed extension to the Phœnix Bridge Company.

The Norfolk & Western Railway has appropriated $250,000 for new steel bridges on the Ice Creek division of the road, and every trestle will be discarded.

There is a movement on foot among the business men of the upper valley to form a bridge company, and build a new bridge between Bridgeport and West Brownsville, Washington County, Pa.

The Schultz Bridge & Iron Company of Pittsburgh have secured a contract for the structural work of a bridge at New Kensington, Pa. About 800 tons of material will be required.

The Pittsburgh Bridge Company of Pittsburgh have received a contract for the superstructures for 13 bridges, to be erected in Allegheny County, Pa., at a cost of $18,995.

The Phœnix Bridge Company of Phœnixville, Pa., have received a contract from the Japanese Government, through the American agents in New York, to build a large steel bridge for the Imperial Railway of Japan.

Hardware.

Lynchburg Hardware Mfg. Company, successors to Lynchburg Brass Mfg. Company, Lynchburg, Va., are now at work putting up large and commodious buildings for their new hardware plant, and they hope to vacate their present cramped quarters within four months. They are now making a specialty of electric push buttons, electric desk lights and other electrical goods, but as soon as they take possesion of their new plant they will add a line of general builders' hardware, such as locks, hinges, sash pulleys, sash fasteners, &c. They propose to move all the machinery and patterns formerly owned and operated by the Norwich Lock Mfg. Company, Roanoke, Va., to Lynchburg as soon as the new buildings are completed.

The Lodi Mfg. Company, Lodi, Ohio, have been incorporated with a capital stock of $50,000. They will make a large line of hardware specialties, the inventions of E. D. Berry, late of the Zenith Mfg. Company, Cleveland, Ohio. Mr. Berry is president and A. B. Taylor, president of the Exchange Bank of Lodi, treasurer of the new company. A two-story brick factory is being erected, which will be completed in 90 days.

Hoopes & Townsend Company of Philadelphia have been incorporated with a capital stock of $1,000,000. The incorporators are Clement R. Hoopes, Barton Hoopes and Dawson Hoopes.

Landers, Frary & Clark, New Britain, Conn., are making additions to their plant. One of these will be used for foundry purposes, and will contain an annealing room, rolling mill, &c. It will be 75 x 25 feet in dimensions. The other will be for the manufacture of general hardware. This building will be of the same dimensions as the former, and three stories high. Another story is also being added to the forging room.

Loring Coes & Co., Worcester, Mass., have been incorporated under that style with a capital stock of $50,000. Loring Coes has been elected president and treasurer, Frank L. Coes, vice-president; Frederick Searle, superintendent, and Charles Rose, Jr., secretary. The three first named members have been identified with the company for a number of years past. Mr. Rose has been with the firm but a few weeks. Previous to that time he had been employed for upward of eight years in the office of the Washburn & Moen Mfg. Company, leaving his position with that concern to accept the present one.

Glens Falls Lantern Company, Glens Falls, N. Y., have purchased the building they have occupied as a factory for the past year. They are intending to enlarge their plant, so as to be in position to keep pace with the growing demand for their Hermance patent non-spilling safety lantern, of which they are sole manufacturers.

The Kelly Axe Mfg. Company, Alexandria, Ind., have resumed operations after a stoppage of several weeks, during which repairs were made and some extensive improvements were completed. A new 1400 horse-power engine has been installed, taking the place of three small ones. The output, it is stated, will be larger than heretofore.

The Springless Lock Company, Kansas City, Mo., have reorganized with larger capital as the American Springless Lock Mfg. Company. The officers and stockholders are as follows: President, J. J. Kendrick; vice-president, O. F. Tomlinson; secretary and treasurer, T. J. Slaughter. The two new members—Messrs. Tomlinson and Slaughter—came from Liberty, Mo., where the former has been engaged in the hardware business. The company manufacture a door lock entirely without springs. The enlarged plant will start with 20 or more employees and will produce 50 dozen locks daily.

W. H. Neff, Cowan, Ind., manufacturer of washing machines, has just brought out a lawn swing, embodying some new features, and offered at a moderate price. Mr. Neff's manufacturing facilities have been considerably increased, the portion of plant recently destroyed by fire having been rebuilt, and the working force augmented, running ten hours per day.

Charles Parker Company, Meriden, Conn., and 96 Chambers street, New York, recently shipped to London 180 vises, consisting of two different numbers of first quality goods. Quotations were made in response to a cable inquiry, and they were advised if prices were not too high above competing German manufacturers they would receive the order, which finally came to them.

Geo. W. Hoffman, Indianapolis, Ind., manufacturer of U. S. and other metal polishes, informs us that he has recently made an extensive shipment of United States metal polish to Canada, while orders from abroad are also on the increase, the demand being so large as to tax the capacity of his plant.

Miscellaneous.

Graff & Co. of Pittsburgh have made application for a charter of incorporation. The incorporators are James F. MacKee, Henry L. Graff, John D. Graff, Abram W. Wall and Frank F. Jeffries. This new corporation will take over the business of Graff & Co. of Pittsburgh, manufacturers of stoves and ranges, whose new works are located at Monongahela City, Pa.

The Geuder & Paeschke Mfg. Company are arranging to make important additions to their large tinware and stamping plant at Milwaukee, Wis. The capacity of the factory will be greatly enlarged.

The Missouri Anchor Fence Company of St. Joseph, Mo., have been incorporated with a paid in capital of $15,000 by E. C. Smith, E. A. King, J. O. Barkley and others.

A new company for making wire fence have been organized at Adrian, Mich., called the Adrian Spring Steel Wire Fence Company. The capital is $100,000. A. M. Keeney is president and Congressman H. C. Smith is vice-president.

The Malleable Post & Iron Company, St. Paul, Minn., have been incorporated with a capital of $60,000 by J. Lockey, W. H. Kent, J. S. Wiggins.

The Uniontown Acme Radiator Company were organized at Uniontown, Pa., last week. The officials are Fuller Hoggset, president; Altha L. Moser, vice-president; Lloyd S. McCrum, secretary, and Isaac W. Semans, treasurer.

The Westinghouse Electric & Mfg. Company have received a contract from the Scott Paper Company and the Wabash Paper Company of Wabash, Ind., for electrical equipment for their large paper manufacturing plants. The companies have found that by the adoption of electricity they can effect a saving in power of fully 50 per cent., and the machines can be attended more easily and with less men than in a steam plant. The Westinghouse Electric & Mfg. Company have also received a contract from the Norton Coal Company of Philadelphia, Pa., for the equipment of their mines with 150 horse-power generators and seven 75 horse-power motors.

James A. Spargo, proprietor of the Spargo Wire Works, Rome, N. Y., is having plans drawn for a new brick addition, 75 x 60 feet, also a boiler and engine house for a 150 horse-power boiler and engine. Business has been so good that the works have been run 14 hours every day for the past two years, and it is now necessary to double the capacity of the plant to supply the demand. The entire product is sold to the manufacturers of insulated wire and cables and to wire cloth works. Pure lake copper wire only is used.

The Pittsburgh Reduction Company of Pittsburgh, manufacturers of pure aluminum, with works at New Kensington, Pa., and Niagara Falls, N. Y., have received an order from the Chicago Northwestern Elevated Railway Company for 150,000 pounds of aluminum, to be used as feed wires on that road.

The Iron and Metal Trades.

The market is getting into a more and more excited condition and the scarcity of material is even more pronounced than it has been. Prices are irregular in this respect, that they vary within considerable limits, early deliveries commanding a considerable premium, whose magnitude depends upon the circumstances governing each individual case.

Large interests have been covering forward requirements to an extent which reflects both their confidence in the future and the fact that they are swelling their order books. Last week a leading interest in the Central West bought 42,000 tons of Pig Iron, but, on the other hand, another large consolidation withdrew from the market an inquiry for about 60,000 tons. Since then the market has advanced sharply, and to day the Bessemer Association is to fix a new price, which, it is generally expected, will be $18 at Valley furnace. It is estimated that the furnaces in the association can only offer for sale, at the utmost, for this year's delivery, between 50,000 and 60,000 tons.

In the East there have been sales of Basic Pig Iron to the extent of about 16,000 tons at close to $16, delivered. In Chicago the Republic Iron & Steel Company have purchased large lots of Gray Forge Pig Iron for their different plants, and have also closed for about 35,000 tons of Sheet Billets at private terms.

Some of the Southern furnaces have sold large blocks of Mill Irons, and have also taken considerable business in Basic Pig for Eastern and Western markets.

Some reference has been made to efforts to release sales of Foundry Irons made some time since for export by the payment of a premium. This has been done to some extent, but the quantities involved cannot affect the situation. There is some talk, too, of founders selling Iron due to them, as more profitable than turning it into goods.

The preparations to blow in furnaces continue, but are much hampered by difficulties in securing supplies of Ore and Coke, and by delays in delivering equipment needed and material for repairs. Many of them are even now sold for months following the time set for the beginning of operations. Still the increase must tell, unless consumption keeps up at the present rate. How much the melting has grown is clearly shown by the statistics prepared by Rogers, Brown & Co., which we print elsewhere.

Reports are beginning to crop up concerning the suspension of enterprises through the rapid rise in Iron and Steel. We have investigated one important line, that relating to Structural Material for bridges and buildings, and find that while a number of instances are cited, the majority of the construction shops have not met with such experiences.

The great Steel works and rolling mills are crowded with work well into the closing months of this year, and in their sales have discounted the additions to plant now under way.

The really serious question is to what extent and at what prices buyers who are now working up cheap material will come into the market. The rapid rise is naturally causing uneasiness, since a sharp reaction might lead to cancellations, and to withholding of specifications by those who, being belated, purchased largely at prices recently prevailing. As yet, of course, there is not the slightest indication of that.

The Eastern Bar Iron manufacturers will probably not undertake a consolidation.

The Pipe consolidation will be ready for the public in a few days.

A Comparison of Prices

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

	May 24. 1899.	May. 17, 1899.	Apr. 26, 1899.	May 25. 1898.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia	**$16.00**	$15.75	$15.75	$10 50
Foundry Pig, No. 2, Southern, Cincinnati	**14.75**	14.50	14 50	9.25
Foundry Pig, No. 2, Local, Chicago	15.50	15 50	15.50	11.00
Bessemer Pig, Pittsburgh	**17.65**	16 50	15.00	10.25
Gray Forge, Pittsburgh	**15.25**	15.00	14.50	9.00
Lake Superior Charcoal, Chicago	**17.50**	17.00	17.00	11.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	**28.00**	27.00	25.50	14.75
Steel Billets, Philadelphia	**29.75**	29.00	28.00	17.00
Steel Billets, Chicago	**28.50**	28 00	25.50	16.25
Wire Rods, Pittsburgh	.....	.....	32.00	20.50
Steel Rails Heavy, Eastern Mill	25.00	25.00	25 00	18.00
Spikes, Tidewater	1.70	1.70	1.70	1.40
Splice Bars, Tidewater	**1.45**	1.40	1.40	1.05
OLD MATERIAL:				
O. Steel Rails, Chicago	**12.00**	11.00	11.50	8.00
O. Steel Rails, Philadelphia	*11.00*	14.00	14.50	10.25
O. Iron Rails, Chicago	18.00	17.00	18.00	12.25
O. Iron Rails, Philadelphia	18.00	18.00	18.00	12.00
O. Car Wheels, Chicago	**15.50**	15.50	15.00	11.50
O. Car Wheels, Philadelphia	15.00	15.00	15.00	10.25
Heavy Steel Scrap, Chicago	10.00	8.50	10.00	8.00
FINISHED IRON AND STEEL:				
Refined Iron Bars Philadelphia	**1.60**	1.55	1.50	1.05
Common Iron Bars, Youngstown	**1.60**	1.50	1.50	0.90
Steel Bars, Tidewater	**1.80**	1.75	1.75	1.10
Steel Bars, Pittsburgh	**1.75**	1.65	1.65	0.90
Tank Plates, Tidewater	**2.30**	2.25	2.20	1.25
Tank Plates, Pittsburgh	**2.20**	2 10	2.10	1.10
Beams, Tidewater	1 63	1.63	1.63	1.30
Beams, Pittsburgh	1.50	1.50	1.50	1 15
Angles, Tidewater	*1.65*	1.65	1.70	1.20
Angles, Pittsburgh	1.50	1.50	1.50	1.05
Skelp, Grooved Iron, Pittsburgh	**1.90**	1.80	1.65	1.05
Skelp, Sheared Iron, Pittsburgh	**2.10**	1.95	1.90	1.10
Sheets, No. 27, Chicago	**3.15**	2.90	2.90	2.00
Sheets, No. 27 Pittsburgh	**2.85**	2.70	2.50	1.85
Barb Wire, Galv, f.o.b. Pittsburgh	2.70	2.70	2 70	1.70
Wire Nails, f.o b. Pittsburgh	2.10	2.10	2.10	1.30
Cut Nails, Mill	1.65	1.65	1.65	1.07½
METALS:				
Copper, New York	*18.50*	18.50	19.25	12.00
Spelter, St. Louis	**6.75**	6.70	6 50	....
Lead, New York	**4.45**	4 45	4.30	3.60
Lead, St. Louis	**4.30**	4.32½	4.17½	....
Tin, New York	**25.65**	25 65	25.30	14.60
Antimony, Hallett, New York	10.00	10.00	10.00	8.75
Nickel, New York	38.00	38.00	38.00	34.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	4.05	4.05	4.05	2.85

Chicago (*By Telegraph.*)

Office of *The Iron Age*, 805 Fisher Building,
CHICAGO, May 24, 1899.

The predictions of higher prices made last week were realized earlier than expected. Almost everything shows an advance, which in some cases is quite heavy. Further advances are in the air, and likely to develop shortly. The negotiations over the wages scale for the coming year are watched with much interest, as any considerable advance in wages is expected to have further stiffening effects upon Finished Iron and Steel. The fear of lower prices has now completely disappeared, and the only question coming up in this connection is whether prices can go much higher without seriously affecting consumption.

Pig Iron.—The week has been marked by great activity. Heavy sales have been made of both Northern and Southern Iron, the total tonnage running up close to the best weeks ever known here. The Malleable casting companies are in the market placing large contracts for future delivery, while makers of Gray Iron Castings are also buying quite liberally. Another element in the market is the Republic Iron & Steel Company, whose purchasing department is now located in this city. They have bought some Gray Forge for shipment to their several works, making contracts for more than one 5000-ton lot. The trade believe that still more business is to be expected from that quarter. Other large consolidations whose headquarters have recently been located here also are about to enter the market. This city is thus becoming a much more important Pig Iron center than at any time in the past. The local furnaces are rapidly getting into such condition that their sales agents will soon be out of business if the buying movement continues at its present volume for another week or two. The Ohio and Southern furnaces are selling Foundry in small lots only, and even on such business they require inquiries to be referred to them. Bessemer Pig Iron, Ohio Softeners and Lake Superior Charcoal have sharply advanced, high numbers of Charcoal being exceedingly scarce and very dear. Other quotations are likely to be advanced next week, judging from the present outlook. We quote for cash as follows:

Lake Superior Charcoal	$17.50 to $20.00
Local Coke Foundry, No. 1	16.00 to 16.50

Local Coke Foundry, No. 2	15.50 to 16.00
Local Coke Foundry, No. 3	15.00 to 15.50
Local Scotch, No. 1	16.50 to 17.00
Ohio Strong Softeners, No. 1	18.00 to 19.00
Southern Silvery	16.00 to 16.25
Southern Coke, No. 1	16.00 to 16.25
Southern Coke, No. 2	15.50 to 15.75
Southern Coke, No. 3	15 00 to 15.25
Southern Coke, No. 1 Soft	16.00 to 16.25
Southern Coke, No. 2 Soft	15.50 to 15.75
Foundry Forge	14.25 to 14.50
Gray Forge and Mottled	14.25 to 14.50
Southern Charcoal Softeners	16.00 to 16.50
Alabama and Georgia Car Wheel	18.00 to 19.00
Malleable Bessemer	17.00 to 18.00
Standard Bessemer	17.00 to 18.00
Jackson County and Kentucky Silvery, according to Silicon	18.00 to 19.00

Cast Iron Pipe.—Numerous contracts are being placed by Western municipalities ,but they are almost invariably for small lots. The high prices now ruling are discouraging the purchase of large quantities as so much more money is required than had been the case for several years. The Pipe foundries are not running to full capacity, but could do a great deal more business. The Pipe manufacturers feel, however, that business which is now deferred is only postponed, and will ultimately come up for settlement. The strength of Pig Iron and its continued upward tendency may make present prices of Pipe seem low.

Bars.—Transactions have been on a moderately heavy scale during the week, and large inquiries are being received from implement manufacturers, who are about to make negotiations for their next year's requirements. All prices have been advanced. Mill shipments of Common Iron are held at 1.70c. to 1.80c., Chicago, and terms have been radically changed. Mills are making no flat prices, but adhere strictly to half extras, and are insisting on net cash 30 days. Mill shipments of Soft Steel Bars are quoted at 1.80c. to 1.90c., Chicago, and considerable difficulty is found in making arrangements for early delivery. Hoops and Bands have advanced $2 per ton, being quoted at 2.15c., base, Chicago, for Bands. Jobbers are enjoying an extremely good trade, and quote small lots from stock at 2c. for Bar Iron; 1.80c. to 1.90c. for Soft Steel Bars, and 3.20c. to 3.25c. for large lots of Norway and Swedish Iron, and 3.50c. for small lots. The price on Soft Steel Bars is admitted to be lower than general trade conditions warrant, and it is probable that before the end of the week an advance will be made.

Car Material.—Steel Axles have been marked up another $4 per ton, being quoted at 2.15c., Chicago. Business is quiet in car material.

Structural Material.—A local railway will require about 1000 tons for an extension to their repair shops. No other project of considerable size is now under consideration, but an immense tonnage of orders is being received against contracts. All the bridge works are crowded to their full capacity for the remainder of the year, and have pretty well covered their requirements. The demand for small lots of building material is extremely active, and the local yards are far in arrears in deliveries. The large Structural mills are very busy, and their fittings shops particularly are months behind. Prices are firm. Mill shipments are quoted as follows, Chicago delivery: Beams, 18 inches and over, also Angles under 3 and over 6 inches, 1.75c. to 1.85c.; Beams and Channels, 15 inches and under, and Angles 3 to 6 inches, 1.65c. to 1.75c.; Tees, 1.70c. to 1.80c.; Universal Plates, 2.15c. to 2.25c. Store prices are from ¼c. to ½c. above these prices.

Plates.—The demand for Plates continues unabated, many inquiries being turned down, because manufacturers are absolutely unable to consider them for the deliveries desired. The local jobbers are doing a large business, having heavy stocks from which they are able to make prompt shipment. They are, however, beginning to feel the effect of the trade in Heavy Plates, and stocks of these are rapidly diminishing. Small lots of Tank Steel from stock are selling at 2.60c. to 2.85c. Mill shipments are quoted as follows: Tank Steel, 2.25c. to 2.40c.; Shell, 2.40c. to 2.55c.; Flange, 2.50c. to 2.60c.; Marine, 2.65c. to 2.75c.; Fire Box, 2.75c. to 4c., according to brand.

Merchant Pipe.—Conditions are getting worse for buyers; mills now quote two 10's off, and are unable to make any promises with regard to shipments. Merchant Steel Boiler Tubes are now quoted in small lots, 1¼ to 1¾ inches inclusive, 40 per cent. off; 2 to 2¾ inches inclusive, 52½ per cent. off; 3 inches and larger, 57½ per cent. off, with an extra 5 off for carload lots.

Sheets.—Manufacturers' agents report a good demand, the trade in Galvanized Sheets showing specially decided improvement. Mill shipments of No. 27 Black are quoted at 3.15c., Chicago, and Galvanized Sheets at 70 and 10 to 70 per cent. off. Some mills are asking as high as 60 and two 10's. Jobbers quote small lots from stock at 3c. and 3.15c. for No. 27 Black, 3.35c. for Wood's Smooth, and 70 and 5 to 70 per cent. off for Galvanized.

Merchant Steel.—An average week's business is reported. Manufacturers have again advanced their prices, finding that they are not catching up on deliveries. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 2.45c. to 2.55c.; Smooth Finished Tire, 2.25c. to 2.35c.; Open Hearth Spring Steel, 2.70c. to 2.80c., base; Toe Calk, 2.45c. to 2.55c., base; Ordinary Tool Steel, 5.50c. to 7c.; Specials, 10c. and upward. Jobbers are quoting small lots from stock at 2.75c. for Tire, 2.95c. for Machinery, 3.20c. for Spring, and 2.95c. for Toe Calk, full extras.

Billets and Rods.—The scarcity of Steel is shown by the fact that Pittsburgh is endeavoring to purchase Slabs in this market for shipment eastward. The local makers, however, are unable to handle any of this business. The manufacturers of Wire Rods continue out of the market, their product being sold up for some time in the future.

Rails and Track Supplies.—Nothing new has developed in the Rail situation, small quantities only being purchased by makers of railroad specialties. Standard Sections are quoted at $26 to $28, according to quantity, and Light Weight Sections at $30 to $37, according to weight. Track Supplies are quoted as follows: Splice Bars, 1.40c. to 1.50c.; Spikes, 2.05c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.65c. to 2.75c.; Square Nuts, 2.55c. to 2.65c.; Steel Links and Pins, 2.15c. to 2.20c.; Iron Links and Pins, 2c.

Old Material.—The market has been rather quiet, only a few dealers reporting transactions of any moment. A significant sale was of Low Phosphorus Steel Scrap, which brought $20 gross ton. Our quotations are continued mainly as reported last week. While some prices may not now be realized by dealers, yet the strength of the general Iron trade is such that any buying movement will be almost sure to advance prices. Dealers' selling quotations are as follows, per gross ton: Old Iron Rails, $18; Old Steel Rails, mixed lengths, $12 to $12.50; Selected Long Lengths, $13 to $13.50; Relaying Rails, $18 to $19; Old Car Wheels, $15.50; Heavy Melting Steel Scrap, $10 to $11; Mixed Steel, $8.50. The following selling prices are per net ton: No. 1 Railroad Wrought, $16 to $16.50; Dealers' Forge, $12.50; Fish Plates, $16; No. 1 Mill, $9 to $9.50; Heavy Cast, $11 to $11.25; Stove Plates, $7 to $7.50; Iron Car Axles, $18.50; Horseshoes, $11.50; Cast Borings, $5.50 to $6; Steel Axle Turnings, $8.25; Iron Axle Turnings, $8.75; Machine Shop Turnings, $7.

Metals.—Copper has receded still further, carload lots of Lake being now offered at 18¾c. and Western at 17¾c. Spelter is unchanged, and firmly held at 6.80c. Pig Lead is steady at 4.45c.

Tin Plate.—Large stocks held by Western jobbers are having a little effect on the price of Roofing Plates, on which some concessions are being made. Manufacturers. however, are firmly maintaining their prices. Bright Plates are decidedly scarce. Prices are maintained.

Philadelphia.

Office of *The Iron Age*, Forrest Building,
PHILADELPHIA, PA., May 23, 1899.

It is getting to be an impossibility to follow the market very closely. Buyers have to go shopping around to find what they want, and when they find it prices are a matter of private arrangement. Nobody cares for quotations made by others, because they all feel that if they do not get the price that suits them to-day they are almost certain to get it from the next caller, consequently quotations at which either sales or purchases could be made are almost an impossibility. The great difficulty at this time is to find sellers that want business. The selling interests are as much in the dark as buyers are. They know that they can get plenty of business, but they do not know what price they should take it at or how much of the order they should take. This, of course, makes a nervous, unsettled market, and one that it is impossible to diagnose with any degree of confidence. It looks very much as though prices were going higher, but consumers are less worried about that than they are in regard to securing material to go on with. A good deal of business has been entered during the week at an average of prices higher than any that have been realized in ten years. Iron and Steel is in enormous demand, however, and it is not unlikely that comparatively high figures have come to stay for a long time to come. Be that as it may, nobody talks decline these days.

Pig Iron.—The market is strong but prices are irregular and higher than they were a week ago. No. 2 X Foundry seems to have settled at $16 as an inside figure;

some quote $16.25 while others name $16.50 as their price. Business is being done at all these various figures, but the tendency is upward, and it looks as though new quotations would have to be made in the not very distant future. Consumption is on an unprecedented scale, and so far as can be seen is likely to continue so indefinitely. There are no signs of retrogression anywhere, and with the extreme shortage in supplies it will be no easy matter to prevent prices reaching a point which the trade are not anxious to see. It may, in fact, be said that the best interests of both producers and consumers are believed to be in a medium range of prices, and that any material advance beyond the rates now ruling will be discouraged as far as it is possible to do so. Meanwhile, however, the pressure for material is very great, and until the supply becomes larger it will be very little use to talk prices down. The one thing that appears to be certain beyond peradventure is that for the present there is no prospect of a decline; whether there will be much of an advance is something that time alone can tell. Sales of all grades have been on a fairly liberal scale, including from 15,000 to 20,000 tons Basic, the range of prices being as follows for seaboard or equivalent points: No. 1 X Foundry, $16.75 to $17.25; No. 2 X Foundry, $16 to $16.50; Plain, $15.50 to $16; Standard Mill Iron, $15.50 to $15.75; Cinder Irons, $14.50 to $15; Basic, $15.75 to $16; Low Phosphorus, $19.50 to $20, according to points of delivery.

Billets.—There is a good deal of inquiry for Steel, but it is almost impossible to get any under firm offers. Prices are nominally $29.75 to $30.50, but there is practically no Steel for sale.

Plates.—The report of last week would be equally applicable to the market to-day. There is far more business offered than can be taken, so that manufacturers have to pick and choose, giving the preference to their regular trade, which they recognize as having the first claim. Prices are very strong, and although quotations are nominally as follows, more money is bid providing that prompt shipments can be guaranteed: Carload lots and upward are quoted 2.30c. to 2.35c. for ¼-inch and thicker; Shell, 2.40c. to 2.45c.; Flange, 2.60c.; Fire Box, 2.70c.

Structural Material.—The same conditions prevail as in the Plate trade. Mills are overrun with business, including some very important orders for bridges for Chinese and Japanese account. It is impossible to specify all the orders that come in, but they cover a wider range than ever, without the slightest indication of any falling off in the demand. Prices are nominally as follows, but for shipments during May or June buyers are frequently willing to pay $2 or $3 per ton more money: Angles, 1.63c.; Beams, 15-inch, 1.63c.; Tees, 1.68c.; Zee Bars, 1.68c.; Bulb and Deck Beams, 1.83c.

Bars.—At a meeting of the Eastern Bar Iron Association, held here on Friday, it was found that there has been no falling off in the demand and that mills are full of work, averaging from July to September. The demand is as strong as ever and any mill that wants busines can get it at quoted rates, but there is a disposition to be very conservative in regard to long contracts. The attempt to form a combine of all the Eastern Bar mills has been abandoned, but the four mills at Columbia and York, including the Vesta and Aurora furnaces, have come together, with a capital of $3,000,000, of which only one-half is to be issued at this time. Prices for Bars are very strong and are quoted as follows for seaboard delivery or its equivalent: Ordinary Bars, 1.45c. to 1.50c.; Refined Bars, 1.60c. to 1.65c.; Test Bars, 1.70c.; Steel Bars, 1.85c. to 1.90c.

Sheets.—There is no falling off in the demand and mills are still running to their utmost capacity. All the various numbers are wanted, and from present appearances it will be very difficult to meet all the calls that will be made on the mills during the summer months. Prices very firm as follows for best makes (Common Sheets two-tenths less): No. 10, 2.60c.; No. 14, 2.70c.; No. 16, 2.80c.; Nos. 18-20, 2.90c.; Nos. 21-24, 3c.; Nos. 26, 27, 3.10c.; No. 28, 3.20c.

Old Material.—There is a fair business doing, but there is so much material offering that mills are not bidding as freely as they did some time ago. Holders are pretty firm, however, but the market will not stand much forcing without the danger of breaking prices. The following are a fair average of bids and offers for deliveries in buyers' yards: Cast Borings, $10.50 to $11; Wrought Turnings, $11.50 to $12; Machinery Cast, $13 to $13.50; Old Car Wheels, $15 to $15.50; Heavy Steel Scrap, $13.75 to $14; Steel Rails, $14 to $15; Iron Rails, $18 to $19; No. 1 Railway Scrap, $18 to $19; Iron Axles, $21 to $22; Steel Axles, $16.50 to $17.50.

Cleveland.

CLEVELAND, OHIO, May 23, 1899.

Iron Ore.—The Ore unloaders at Lake Erie ports other than Cleveland have threatened to strike unless granted an additional advance of 1 cent per ton. It will be remembered that when the dock interests advanced the cost of unloading from 14c. to 16c. at the opening of the season the workmen were given an advance of 1c., making the rate 11c. at Cleveland, and 10c. at other ports on Lake Erie. Then came a demand for a further increase, the men finally agreeing to continue at work two weeks in order to give the dock managers an opportunity to consider the matter. The time expires this week, and accordingly the managers and men had a conference last week at which it was decided that the workers at Ashtabula, Fairport and Conneaut, Ohio, and Erie, Pa., should be accorded ½c. advance. The full schedule of wages as it now stands is: For unloading boats, 10½c. per ton; overtime, 18 cents per hour extra; loading Ore by machine, 6c. per ton; loading by hand, 60,000 pound cars, $2; 70,000 pound cars, $2.25; 80,000 pound cars, $2.50; 90,000 pound cars, $2.75; 100,000 pound cars, $3; trimming cars, 60,000 and 70,000 pound cars, 20c.; 80,000 and 90,000 pound cars, 25c.; 100,000 pound cars, 30c.; day work of 10 hours, $1.50; 11 hours, $1.57½; 12 hours, $1.65, and over 12 hours men to receive 30c. per hour double time. The hoisters of Ore will receive 35c. per hour overtime, and their regular wages of $60 per month.

Strong appeals have recently been received at the offices of the companies operating vessels in the Iron Ore trade, urging the resumption of the practice of trimming cargoes, which has been abandoned since the Ore trade has been confined largely to the largest type of lake freighters, and which was induced to a considerable extent by the necessity for economy in view of the low freight rates which prevailed last season. Owners of the large vessels say in answer to these protests that they are well satisfied that the boats can be operated with little or no disadvantage without trimming and that they have no desire or intention of abandoning the plan at present in force.

Rates for carrying Ore have advanced steadily during the past week, and all the boats on the market have been taken with little delay. The rate for Ore from the head of the lakes, which opened at 60c., is now 70c., while Marquette charters have been made at 65c., and boats ready to load at Escanaba have no difficulty in securing cargoes at 60c. The Escanaba rate opened at 50c. The excessive activity in the Coal trade will tend to compel Ore shippers to bid up for boats. On Monday 50c. was bid for cargoes of Coal from Lake Erie ports to Milwaukee, an advance of 150 per cent. over the rate this time last year. Sales of Ore during the past week have been only in small scattering lots, and the advances over association figures have not varied materially from those paid for several weeks past. There is no doubt that the present week will see an advance of at least 5c. in the rates from all ports.

Pig Iron.—The situation has developed exceptional strength very rapidly in all branches during the past week. The Carnegie purchase of Bessemer Iron has practically cleaned up the market. A small amount of speculative Iron is on the market, but it is not of sufficient proportions to exert any considerable influence. A demand of $17.35, Valley, was made at the beginning of the week, and there is no doubt that $17 could be obtained easily. The demand for Foundry Iron is fully keeping pace with the other grade. Sales have been made at various prices above and below, but $16, Valley furnace, for No. 1, and $15.75, Valley furnace, for No. 2 may be taken as conservative quotations for the respective grades and sales of lots up to 1000 tons have been made at these figures. Sales made are in most cases for third or fourth quarter delivery. It is practically impossible to buy any Iron for quick delivery, but some sales have already been made for the first quarter of 1900. Sales in most grades have not been particularly active during the week just closed owing to an evident indisposition of purchasers to take hold at the advanced prices, and yet it is no exaggeration to say that the market is possessed of undoubted strength. Lake Superior Charcoal will bring almost any price, the sole question being ability to obtain delivery. A quotation of $19 on Lake Erie dock was made to-day.

Finished Material.—A general advance or added stability has been the order in the market during the week just closed. The general quotation for Bar Iron is 1.80c. to 1.85c., although sales are still being made from stock at 1.75c. Machinery Steel has advanced to 2.10c. and 3.20c. is demanded for No. 27 Sheets. The advance of $2 per ton in Hoops and Bands has, of course, braced this section of the market materially. Local sales agents report a very fair inquiry and order mail, with some good sized sales notably of Beams and Angles and a lot of 600 tons of Ingots. Pipe quotations for car lots are 60 and

three 10's, and for less than car lots 60 and two 10's and 5.

Old Material.— The general advance of the past week has served to send quotations upward in the Old Material market in a proportionate degree. The supply does not seem to have improved materially, but the demand is picking up perceptibly, and it looks very much as if there would not be sufficient Scrap to go around. Quotations under this date are as follows: No. 1 Wrought, $18; No. 1 Cast, $12.50; Steel Melting, $15; Car Wheels, $16; Iron Rails, $20; Borings, $9.50; Turnings, $11.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, May 24, 1899.

(By Telegraph.)

Pig Iron.—The Pig Iron market is excited and prices are going skyward very rapidly. There is really no standard price on any kind of Pig Iron, nearly every transaction being at a higher figure than the preceding one. Bessemer Pig for foundry use has sold at $17.50, Valley furnace, for delivery over last half of the year. No. 2 Foundry is reported to have sold at $16.50, Gray Forge at $15.25 and Basic at $16.25, all f.o.b. Pittsburgh. The Bessemer Furnace Association Committee is now in session in Cleveland acting on inquiries, and the price will likely be advanced to $17 and may be put higher. The last sales made by the association about a week ago were at $16. Gray Forge is very scarce and so is Foundry Iron. The whole market is very much excited and prices will probably go very much higher. In the present condition it is useless to quote, as the next 24 hours may find Pig Iron $1 a ton or more higher. The best index of existing conditions is sales, which we note as follows: Three thousand tons Bessemer Pig, equal deliveries over last half, at $17.50, Valley furnace; 1000 tons for third quarter at $17.65, Pittsburgh; 3000 tons of Gray Forge at $15.25, Pittsburgh; 2000 tons at $15.30, Pittsburgh; 1500 tons of No. 3 Foundry at $15.75; 1000 tons of No. 2 at $16.35, both Pittsburgh; also 1500 tons of Basic Bessemer at $16.25, Pittsburgh. We also note a sale of 1000 tons of White Mottled Iron at $14.85, Pittsburgh.

Steel.—The price of Billets is largely problematical, but the market is all of $28, Pittsburgh. There is not much inquiry and buyers pay the price asked only when compelled to come into the market. Local mills are not selling any Steel of any kind, having none to spare. All the large consumers are covered at much lower prices, some of them into next year.

Muck Bars.—The price of Muck Bars is very much higher. We note sales of standard grade at considerably above $31, Pittsburgh, the highest price reached in many years.

Spelter.—The market is much higher and prime Western grades are very close to 7c., f.o.b. Pittsburgh.

(By Mail.)

The original plans for the merging of the entire interests of the Carnegie Steel Company, Limited, and the H. C. Frick Coke Company into one organization have been somewhat modified, and the official announcement made by Henry C. Frick two or three days ago to the effect that there will be preferred stock only, and to the amount of $250,000,000, has done much to set at rest the many false reports being circulated in the trade. On June 15 application will be made by Henry C. Frick, C. M. Schwab, Alexander R. Peacock, Lawrence C. Phipps and Francis T. F. Lovejoy for a charter of incorporation under the laws of Pennsylvania for the Carnegie Steel Company. From this it is assumed that the charter taken out some time since under the laws of New Jersey will be abandoned. The plans of reorganization of these two immense interests will probably be made public within a week or two at the furthest. The Iron and Steel markets in the past week have been considerably excited, and sharp advances in prices have taken place. The last sales of Besemer Pig made by the furnaces were at $16 at furnace, and the Price Committee is to meet in Cleveland on Wednesday, May 24, to act on inquiries for Bessemer amounting to 40,000 or 50,000 tons. It is expected that $17 will be named on these inquiries, while some of the trade believe that $18 will be nearer the figure. It is a fact that a small lot of Bessemer Pig for prompt shipment has sold at $17.50 spot cash at Valley furnace. The Pig Iron market is a good deal excited, and everybody believes that Bessemer will go to $20 in a very short time, while some predict even higher figures. Billets are all of $28, Pittsburgh, maker's mill, but there is no Steel to be had from the local mills, nearly all that is being sold coming from outside districts. Finished Material of all kinds is scarce, and prices on some lines, particularly Sheets and Pipe, are from $2 to $3 a ton higher. Prices are at danger point, and it is the wish of many in the trade that they could be held down, but there does not seem to be any way of doing it. The position is simply that there is not enough material to go around, and a mill that has any thing to sell can get almost any price they ask for it.

Ferromanganese.—Prices are higher, and the local producer quotes $85 for 80 per cent. Ferro at mill. Still higher prices are asked for small lots.

Plates.—The market has advanced squarely to 2.25c. at maker's mill for Sheared Plates, and only in exceptional cases is this price shaded. A good deal of tonnage has been placed in the last week, and considerably more is in sight. The Plate mills are filled up as they never were before, and none are promising deliveries this side of July or August excepting special cases for small lots. We have advanced prices, and now quote: Tank, ¼ inch and heavier, 2.20c. to 2.25c.; Shell, 2.35c. to 2.40c.; Flange, 2.45c. to 2.50c.; Marine, 2.60c. to 2.75c.; Fire Box, 2.75c. to 3.50c., depending on quality.

Bars.—Prices on Steel Bars are higher and a local mill is quoting 1.75c. minimum. There is a heavy demand for Steel Bars, and implement makers are coming into the market for their season requirements. It does not look as though the very high prices are going to restrict tonnage to any extent. Prices on Iron Bars are higher, and while some mills refuse to quote, others name 1.60c. to 1.65c. at mill. The Republic Iron & Steel Company are fast getting their affairs into shape, and some definite policy as to prices will likely be announced in a few days. We quote Steel Bars at 1.75c. to 1.85c., maker's mill, half extras, and Iron Bars at 1.60c. to 1.70c., half extras, maker's mill.

Sheets.—Those having the matter of the consolidation of the Sheet mills in charge report that it is moving along nicely, with every prospect of being successfully put through at an early date. Prices on Sheets are higher this week, and some mills are practically out of the market as sellers. We quote No. 27 Black Sheets at 2.85c.; No. 28, 2.90c. Prices on Galvanized Sheets are very strong and demand seems to be larger than for Black. While we have not advanced quotations, there is every indication that prices will be higher in the next few days. The absolute minimum of the market is 75 per cent. off, with 15c. freight allowance, while some mills, we are advised, are quoting 70 and 10 per cent., with same freight allowance.

Structural Material.—Included in contracts placed last week was one for the superstructures for 13 bridges in Allegheny County, placed with the Pittsburgh Bridge Company, the material to be furnished by a local mill. The demand for Shapes is heavy and buyers are finding considerable difficulty in getting prompt shipments. An advance on all kinds of Structural Material is expected almost any day. We quote Beams and Channels, 15-inch and under, 1.50c.; 18, 20 and 24 inch, 1.60c.; Universal and Sheared Plates, 2.25c.; Tees, 1.55c.; Zees, 1.50c.; Angles, 3-inch and over, 1.50c.; 2 and 2½ inch, 1.90c.; 2½-inch and smaller, 2c., all f.o.b. Pittsburgh.

Pipes and Tubes.—We are advised that the consolidation of the Tube mills into the National Tube Company is practically completed, only a few details remaining to be fixed up. E. C. Converse of the National Tube Works Company will be president and Frank J. Hearne of Riverside Iron Works, vice-president. It is probable that the principal offices will be located in Pittsburgh. None of the Pipe mills are selling for delivery beyond July 1, and one or two are practically out of the market altogether. We quote Merchant Pipe at 60 and three 10's in small lots at maker's mill, with an extra 5 per cent. in carload lots delivered. There is a very heavy demand for Casing, and prices were advanced on Monday, May 22. We quote Screw and Socket Joint at 45 per cent.; Inserted, 40 per cent., with an extra 5 per cent. to dealers. As intimated in this report last week, prices on Boiler Tubes have again been advanced, dating from Thursday, May 18. We quote 1¼ to 1½ inch, Iron and Steel, 40 per cent. off list; 1¾ to 2¼ inch, Iron, 50 per cent.; Steel, 55 per cent.; 2¼-inch and larger, Iron, 55 per cent.; Steel, 57½ per cent., with 5 per cent. to dealers.

Iron and Steel Skelp.—It is almost impossible to get Skelp at any price. A good deal is being brought from Eastern mills to this section. Prices are higher, and we quote Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 2.20c. to 2.30c.; Grooved Iron Skelp, 1.90c. to 1.95c.; Sheared Iron Skelp, 2.10c. to 2.15c., all f.o.b. Pittsburgh.

Connellsville Coke.—There is an enormous demand for Coke, and shipments from the Connellsville region, and also from other districts, are heavier than ever before in the history of the trade. Most of the Coke companies have their entire product under contract, and there is very little surplus Coke to be had at any price. We quote Furnace Coke at $2 to $2.10 and Foundry Coke at $2.15 to dealers and $2.30 to consumers, in tons of 2000 lbs. at oven.

Cincinnati. (*By Telegraph.*)

Office of *The Iron Age*, Fifth and Main streets, CINCINNATI, May 24, 1899.

The past week has been a very active one in Southern Pig Iron. From the present outlook it will not be at all surprising to find an increasing demand throughout the next week, and as a result May will have a very big volume of business to its credit. There is no excitement worthy of note, and the market is strong and bullish. So far as the supplying of uncontracted for wants for the next three or four months is concerned the situation is badly strained and in some instances buyers are willing to leave price with the seller if delivery only is promised when needed. There has been a continued selling of Mill Iron, for the most part for last quarter delivery, though some contracts call for open delivery well into 1900. Mill Irons show an advance of 25c. in actual selling, and a still further asked advance of 25c. above that, making outside figures now $11.25 for Gray Forge, Birmingham. In Foundry Irons there has been an increasing demand, and while but few large orders have been booked yet the volume of medium and small sales has been very large. In Foundry brands many furnaces are asking an advance of 25c, and last week's minimum are now out of the question. The Pioneer Furnace, recently sold to the mill combination, is credited with orders on the books for perhaps 30,000 tons of Foundry Iron, which may be released and the buyers sent again to the open market for their wants. If these happen it will result in a further advance. Indeed, further advance all along the line is almost a certainty anyway. Northern Irons are more active, with more selling and stronger prices. We quote f.o.b. Cincinnati as follows:

Southern Coke, No. 1	$15.25 to $15.50
Southern Coke, No. 2	14.75 to 15.00
Southern Coke, No. 3	14.25 to 14.50
Southern Coke, No. 1 Soft	15.25 to 15.50
Southern Coke, No. 2 Soft	14.50 to 15.00
Southern Coke, Gray Forge	13.75 to 14.00
Southern Coke, Mottled	13.75 to 14.00
Ohio Silvery, No. 1	17.50 to 18.25
Ohio Silvery, No. 2	17.00 to 17.75
Lake Superior Coke, No. 1	16.75 to 17.00
Lake Superior Coke, No. 2	16.25 to 16.75
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel	$16.25 to $16.75
Lake Superior Car Wheel and Malleable	20.00 to 21.00

Plates and Bars.—Mill product is in touch with the general Iron market and business is exceedingly active. Quotations are unchanged though very strongly maintained. Quotations, f.o.b. Cincinnati: Bars, wholesale, 1.60c., with half extras; Bars, retail, 1.75c., with full extras; Bar Angles, 1.75c., wholesale; Plates, 2¼c. for ¼-inch and heavier; Sheets, No. 27, 2.85c.; No. 10, 2.40c.

The W. F. Robertson Steel & Iron Company, Cincinnati, Ohio, have been appointed Cincinnati agents of the American Steel Hoop Company, with the surrounding territory in Ohio, Indiana and Kentucky as tributary to the agency.

St. Louis. (*By Telegraph.*)

Office of *The Iron Age*, 512 Commercial Building, ST. LOUIS, May 24, 1899.

Pig Iron.—The prophets who held lower prices to view have had another shock in the 50c. advance and on the basis of which sales were made in this market this week. A break can only come through conditions which do not now prevail, and so long as the consumption exceeds the production prices will hold up and even advance. Our reports show that the visible stock of Pig Iron is being fast depleted and consideration of that fact cannot justify sensible prediction of a tumble in prices. Local foundries are exceedingly busy on both regular and jobbing work. We quote, f.o.b. cars St. Louis:

Southern, No. 1 Foundry	$16.00 to $16.25
Southern, No. 2 Foundry	15.50 to 15.75
Southern, No. 3 Foundry	15.00 to 15.25
No. 1 Soft	16.00 to 16.25
No. 2 Soft	15.50 to 15.75
Gray Forge	14.50 to 14.75
Mottled	14.25 to 14.50

Bar Iron.—An advance has taken place in jobbers' prices, and 2c., base, full extras, is named out of stock. Some interest is being aroused as to when mill shipments will take place, as buyers are coming with wants which are making inroads on the visible supply. New business is not courted by the new company pending further action on details of sales.

Rails and Track Supplies.—The demand continues in fair volume, but prices show no change, although it is thought that an advance will take effect before long. We quote as follows: Splice Bars, 1.60c. to 1.70c.; Track Bolts, with Square Nuts, 2.60c.; with Hexagon Nuts, 2.75c.; Spikes, 2.20c. to 2.30c.; Iron and Steel Links and Pins, 2.20c. to 2.30c.

Pig Lead.—Nominally conditions are unchanged, but bidding was on a slightly lower basis than occurred yesterday. Common Pig Lead was wanted at 4.27½c., while Desilverized was salable at 4.30c. Refiners are firm and no sales at the lower prices were developed. Lead Ore sold at $26 per 1000 lbs.

Spelter.—The market is firm and quotable at 6.75c., with disposition to buy if to be had under that figure.

Zinc Ore—Fell off $1 last week and sold at $50 per ton. Advices to-day report the 60 per cent. basing Ore unchanged at $47, which figure will obtain throughout this week.

In this time of depleted stocks and overworked producing elements it is advisable for the consumer to post himself as to the available Iron and Steel products to be had out of jobbers' warehouses. We are in receipt of stock list No. 413, issued by the E. E. Souther Iron Company, St. Louis, Mo., which contains a detailed report of Flange Steel Boiler Plate, Plain Boiler Heads, Tank Steel, Structural Shapes, Black and Galvanized Sheets and Boiler Tubes now in stock. Bar Iron, Rivets, Bolts, Screws and sundry supplies are also listed.

New York.

Office of *The Iron Age*, 232-238 William street, NEW YORK, May 24, 1899.

Pig Iron.—The market is very firm, but the amount of sales is restricted through the scarcity on the one hand and the indisposition on the part of buyers to buy beyond immediate requirements at the present prices. In fact, some founders who are not getting much advance on their manufactured products talk of considering the question of taking the profit on their purchases of Pig Iron. Considerable sales of warrants have been reported to the Consolidated Exchange. On Saturday they aggregated 6300 tons, including of No. 2 500 tons of September at $11.75, 500 tons of October at $11⅜, 500 tons of November at $12½, 500 tons of December at $12¼, 500 tons of July at $11⅜, 500 tons each of August and September at $11.50 and 500 tons of October at $11⅝. There are also sales of Gray Forge of 500 tons of September at $10⅝, 500 tons each of October and November at $10¾ and 500 tons of December at $10⅞. It is understood that this Iron is to go into furnace yard in the months named, and that it is not actual warrant Iron now on hand. On Tuesday 100 tons of No. 2 sold at $12½. We quote as follows: Lehigh and Schuylkill Irons, No. 1 Foundry, $16.75 to $17; No. 2 X, $15.75 to $16; No. 2 Soft, $15.50 to $15.75; No. 2 Plain, $15.25 to $15.50, and Gray Forge, $15 to $15.25. Southern brands are quoted: No. 1 Foundry, $16.25 to $16.50; No. 2 Foundry, $15.75 to $16; No. 1 Soft, $15.25 to $15.50; No. 2, $15.25 to $15.50, and Gray Forge, $14.50 to $15.

Cast Iron Pipe.—There have been a number of sales, aggregating about 6000 tons, at private terms. Efforts are being made to reach an arrangement with the outside shops in the East.

Steel Rails.—Eastern mills report only small sales, although offers have been received for large lots for delivery late in the year. Among the export inquiries is one lot of 7000 tons for Japan and for a like quantity to go to Australia, but it is doubtful whether anything can be done. The nominal quotation remains $25 for Standard Sections at Eastern mill.

Track Fastenings.—We quote: Angle Bars, 1.40c. to 1.45c.; Spikes, 1.70c. to 1.80c., and Bolts and Nuts, 2.10c. to 2.20c.

Finished Material.—Among the sales of Structural Material during the current week we may note about 1900 tons for the American Exchange National Bank, 600 tons for a building on Seventh avenue and Thirty-eighth street, 300 tons for the Nurses' Home. Among the large contracts now pending is one lot of about 4000 tons. It is believed that the requirements for the metropolitan district this year will be far above any previous record. We quote as follows: Beams, 1.63c. to 1.75c.; Angles, 1.63c. to 1.70c.; Universal Mill Plates, 2c. to 2.15c.; Tees, 1.70c. to 1.75c.; Channels, 1.63c to 1.75c. Steel Plates are 2.30c. to 2.35c. for Tank, 2.40c. to 2.45c. for Shell, 2.55c. to 2.60c. for Flange, 2.70c. to 2.75c. for Fire Box and 2.75c. to 2.90c. for Locomotive Fire Box, on dock. Refined Bars

are 1.60c. to 1.65c., and Common Bars are 1.40c. to 1.50c., on dock. Soft Steel Bars, 1.80c. to 1.85c.; Steel Axles, 2c. to 2.10c.; Scrap Axles, 1.90c. to 2c.; Links and Pins, 1.65c. to 1.70c.; Hoops, 1.95c. at mill; Best Iron Boiler Rivets, 2.25c. to 2.50c., delivered; Steel Structural Rivets, 1.85c. to 1.90c.; Cotton Ties, 95c. a bundle at mill.

Metal Market.

Office of *The Iron Age*, 232-238 William street, NEW YORK, May 24, 1899.

Pig Tin.—This market has been very quiet throughout the last week and demand was exceedingly poor. Stocks are reported large. The closing price to-day is the same as that quoted last week, namely, 25.65c. to 25.75c. The London market was more active, but closes to-day at figures about the same as those quoted last week, with £117 17s. 6d. for spot and £118 10s. for futures.

Copper.—Business during the whole week was dull and unimportant. Scarcity of inquiries has forced Lake down and it is now quoted 18½c. Electrolytic, Cakes, Wire Bars and Ingots, is quoted 17¾c., and Casting Stock is easy at 17½c. The London market has declined slightly, and closed to-day £77 15s. for spot and £75 15s. for three months' futures. Best Selected remains unchanged at £80 10s. Deliveries for consumption in Great Britain show a very heavy decrease since the beginning of this year. The figures show that the apparent consumption for the first four months of this year was only 18,823 tons against 24,381 tons for the same period of last year.

Pig Lead.—Market is in a very quiet condition and unchanged, with quotations ranging between 4.45c. and 4.50c. Demand is very inactive. The St. Louis market is in the same position, and is quoted 4.27½c. to 4.32½c., while London is unchanged at £14 2s. 6d. The refiners and smelters are beginning to feel the effects of the Cœur d'Alene trouble. There has been no trade information received lately as to the exact condition of affairs there, and it is hard to tell just how long the present conditions will exist. If they are prolonged to any extent the scarcity of ores will, without doubt, have an effect on the market. Imports of Lead into Great Britain for the month of April were somewhat smaller, and amounted to 15,835 tons. Still the total for the first four months of this year shows an increase of 13,844 tons over the same period of 1898 and 17 684 tons over 1897. Advices from the other side to the trade here intimate that this is being held for American account.

Spelter—For spot delivery the market is firm, as through the Buffalo strike shipments fail to reach the consuming centers, and we still quote 6¾c. to 7c. But for future delivery the market is considerably easier, and no disposition is being shown to purchase. Shipments from the West are offered at 6.80c., and for deliveries over the balance of this year offers are made as low as 6.70c. to 6.55c. The St. Louis market is easier and is quoted 6.55c. The Ore market was quiet, with sales at $46 to $50 per ton, according to quality, the outside price being for choice Ores. It is said that some 50 tons of American Spelter were re-imported from London and were sold in this market at 6.75c. The European market is dull and London quotes £28 10s., which is the same figure quoted last week. Private advices to the trade state that there is great activity throughout Europe in opening up new mines which will sooner or later have an effect on the market, and which may be responsible already for the dullness in the Spelter market over there.

Antimony—Is firm and without change. Hallett's is quoted 10c. and Cookson's 11c.

Nickel—Remains unchanged, prices for Canadian Nickel ranging from 38c. to 40c. for lots larger than 1000 and 40c. to 50c. for smaller quantities.

Tin Plate.—The condition is unchanged and a good business is going through owing to the stiff condition of the English market. Prices remain unchanged, and those quoted by the American Tin Plate Company are said to be on a basis of $4.05 to $4.10, 100-lb. Cokes, New York delivery.

The firm of T. B. Coddington & Co., 27 Cliff street, New York, one of the oldest and best known houses in the trade, have disposed of their stock and are about to go out of business. The concern were founded in 1835 by the late T. B. Coddington, and for many years were among the largest importers of Tin Plates on the Atlantic Coast. For the past 31 years they have occupied their present quarters on Cliff street. The present members of the firm are Henry V. B. Nash and Charles Gay. These gentlemen are exceedingly popular members of the New York metal trade, and their retirement from the business will leave a distinct gap in its circle. We understand that Messrs. Nash and Gay have as yet formed no definite plans for the future, but into whatever new sphere of activity they may enter they will assuredly carry with them the most cordial good wishes of their friends and former competitors.

The Magnolia Metal Company of 266 and 267 West street, New York City, have opened an office in Montreal, Canada, for the benefit of their Canadian trade, the address being Room 524, Board of Trade Building, Montreal.

Lake Iron Ore Matters.

DULUTH, May 21, 1899.—A notable interview was printed in a late number of the Ishpeming *Iron Ore* with Capt. Joseph Sellwood, late of the Minnesota Iron Company, on the ore supplies of the Federal Steel (Minnesota) Company. The interview is in line with remarks made by Mr. Sellwood to your correspondent some months ago and at that time briefly reported without name in these columns. He predicts that in five years the Federal will be buying their high grade ore from the Carnegie Company, and says the Chandler mine is on the down grade, its best days having passed. There is truth in the statements, but Mr. Sellwood's connection with some of the executive heads of the Minnesota Iron Company is not particularly amicable, and he takes it much to heart that that company did not purchase the Pioneer mine at his recommendation instead of letting it be gobbled up by Mr. Oliver. Probably the Minnesota Company regret this action to-day as much as Mr. Sellwood. The Chandler is getting down and has ore for not over six or seven years, and perhaps not so long as that if the present tremendous rate of shipment is continued, but it has been and is to-day a wonderfully rich and fortunate mine. There was a time when the Minnesota Company might have secured the entire Merritt interests on the Mesaba range, including the railroad, for something like $1,100,000, and Mr. Sellwood probably recollects quite well that he urged the purchase with the most persuasive eloquence at his command to no avail. The lease by the Minnesota of the Breen mine on the Menominee range and the optioning of two others is an interesting fact in connection with the Sellwood interview. This entrance of the Minnesota to the Menominee range was announced as probable in this correspondence some month or two ago.

Limonite ores, suitable for basic steel production, now seem to be looked for, and the Oliver Company, as usual, are early in the field. They have picked up some properties. The taking of two by the Cleveland Cliffs Company was noted last week. There are vast deposits of ore of this class on the Marquette range that have never been considered of much worth, but would be regarded with high favor in fields where coal, flux and ore lie contiguous. It is not probable that these ores are being secured with a view to early opening, but more to strengthen the position of their owners for the distant future. Of such are many sales and leases now being made on all ranges, for a considerable proportion of the ores taken would not now find favor in the markets. On the Marquette there is rapid progress in cleaning out the Volunteer, recently taken over by the Cleveland Cliffs. They are taking out an immense quantity of water. Primrose Valley is about ready for business and Richmond is working steadily, shipping some 200 tons daily.

Within the past week State leases for a number of properties in Minnesota have been made by the State Land Office. Most of these were in Township 58-19, near Hibbing, but some were on the Vermillion. There is a great deal of exploring on the latter range and for a dozen miles eastward from Ely work is going on, some of the oldest and most prominent mining companies of the lake region being interested. Among the more prominent of these operations to-day are those of the Mahoning Ore Company in Section 36, Township 63-13; those of A. C. Ely in Sections 12, 15, 22 and 16, Township 63-11; of J. M. Underwood in Section 8, 62-13, and in 61-15, and of Murphy in Section 1, 61-15. Some very important leases were taken out in 36 64 10 the past week and west of Tower in 16-61-16. Crews will probably be started at all of these soon. It seems to be the general opinion that a very large body of ore has been found near Tower, as well as another to the east of Ely, and that active mining operations will be under way in both locations before long.

An interesting demonstration of present labor conditions on the ranges is to be noted in the actions of men and employers on the Lake Superior and Ishpeming Railway one day this week. The ore dock men wanted an advance of 25 cents a day, and at the noon hour went in a body to the office to talk it over. There was a short talk with the officials and the men went back to work at one o'clock at the advance they had asked. D. E. W.

Chas. H. Hawkins, Chicago agent for the Brown-Bonnell Iron Company, is in receipt of a letter from an American iron merchant now traveling in Germany, who writes as follows under date of May 10: "Business here is simply immense. Prices are going higher every day, and nobody can see the end. Billets cannot be had for love or money."

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING MAY 24, 1899.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday
$47,100,000	Am. S. & W., Common	49,435	64⅝-66⅛	63⅝-65	63⅛-64¼	62 -63⅛	62¼-64¼	60¼-62⅝
38,150,000	Am. S. & W., Pref. (7 % Cu.)	6,760	97¼-98	-97¾	-97¼	96 -97	97 -97¼	95¾-96⅛
9,250,000	Col. Fuel and Iron	7,287	47½-49⅞	46¾-47⅛	-46¾	46 -46⅛	46¼-47¼	44 -45⅛
46,484,300	Federal Steel, Common	135,030	60⅞-62⅛	59⅜-61⅛	60¼-61⅜	58⅛-60⅜	58⅛-60⅜	57¾-59⅜
53,253,500	Federal Steel, Pref (6 % Non-Cu.)	19,951	81⅜ 82¾	81¼-82¼	81⅛-81⅞	80¾-81¾	80¼-81¼	80⅛-80⅜
20,000,000	Tennessee Coal and Iron	31,130	58½-59½	57¼-58½	-58¼	55¾-58	56¼-57¾	56⅛-57⅝
....	Cambria Iron, Phila*	453	44⅞-45	44 -45	.....	-44¾	-45	.....
.....	Cambria, Steel***	29,823	21⅝-22¼	21⅝-21⅞	-21⅞	21¼-21⅞	20¼-21¼	19¼-20⅝
5,000,000	Penna. Common, Phila	67	-82	.....	-81	.....	24⅜-24⅝	.....
1,500,000	Penna. Pref., Phila	20	-85⅛	-85⅛	.....	.....	.....	.....
28,000,000	Tin Plate Common, New York	21,955	40⅝-41⅜	40 -40⅛	39¼-40¼	38¾-39⅛	37⅝-37⅞	33 -36¼
18,000,000	Tin Plate Pref., N Y. (7 % Cu.)	750	85 -85¼	-84⅛	.....	.....	.....	82 -83
28,000,000	Tin Plate Com., Chic	4,802	41 -41¼	-40	40 -41	39⅛-40	36¾-38⅛	33⅛-36
18,000,000	Tin Plate Pref., Chic. (7 % Cu.)	4,192	-85	84⅛-85	84⅝-85	84¼-85⅛	84 -85	82 -83
32,000,000	National Steel Common, Chic	6,110	52¼-53	52 -52¾	52¼-52⅞	-51¼	48⅛-51	46 -48
27,000,000	National Steel Pref., Chic. (7% Cu)	6,677	88¼ 89	88⅛-89⅝	88½-89	88⅛-89	85⅛-88	85 -86
32,000,000	National Steel, Common, N. Y.	10,355	52⅝-53¼	52 -52¾	52 -52⅝	51 -52	49 -50¾	46 -48½
27,000,000	Nat'l Steel, Pref., N. Y., (7 % Cu.)	3,735	89 -90	-89	-89	.....	86 -88	85 -86
7,500,000	Bethlehem Iron**	1,540	10[illegible] -105	104⅝-105	104⅞-105	104⅛-104¾	103 -103¾	-104
.....	Bethlehem Steel Rights	10,140	23¼-23⅞	23 -23¼	22⅝-23	21¼-22⅞	22 -22⅛	21⅝-22
12,500,000	Pressed Steel, Common	2,060	53 -54	53⅛-54	-52⅛	-52	-51⅛	-50
12,500,000	Pressed Steel, Pref. (7 % Non-Cu.)	2,075	80¼-80⅜	-80¼	-80	-80	79 -80	-79
19,000,000	Am. Steel Hoop, Common	9,066	32¾-33	-32¼	-32¼	31⅛-32	28 -30½	24 -28
14,000,000	Am. Steel Hoop, Pref. (7 % Cu.)	5,200	75⅛-76	-75¼	76 -76¼	74 -76	70 -73	70¼-71

* Par $50. ** 6 % guaranteed by B. S. Co. *** $1.50 per share paid in. Late Philadelphia and Chicago sales by telegraph.

Bonded Indebtedness: Am. S. & W., $730,000; Am. Tin Plate, none; Am Steel Hoop, none; Federal Steel Co., $13,200,000 Illinois 5 %, $7,417,000 E. J. E. R. R. 5 %, $1,600,000 Johnson 6 %, $6,732,000 D. & I. R. R. R. 5 %, $1,000,000 2d D. & I R. R. R. 6 %, $10,000 land grant D. & I. R. R. R. 5 %; National Steel, $1,561,000 6 %; Tennessee C., I. & R. R. Co., $8,367,000 6 %, $1,114,000 7 %, $1,000,000 7 % cu. pref.; Pennsylvania Steel: $1,000,000, Steelton 1st; $2,000,000 Sparrow's Point 1st, $4,000,000 consolidated, both plants; Bethlehem Iron, $1,351,000.

The Standard Metal Company.

Negotiations have been in progress for some time past toward effecting a consolidation of ten of the principal companies in the United States engaged in the manufacture of car journal bearings, bronze and brass specialties. It is proposed to organize the corporation under the laws of New Jersey under the style of the Standard Metal Company. The properties are to be acquired free of all encumbrances and indebtedness. They are as follows: Paul S. Reeves & Son, Philadelphia, Pa.; E. Blunt Mfg. Company, Newark, N. J.; Brady Metal Company, Jersey City, N. J.; Damascus Bronze Company, Pittsburgh, Pa.; Buffalo Brass Company, Buffalo, N. Y.; Fulton Iron & Engine Works, Detroit, Mich.; U. S. Bronze Company, Cleveland, Ohio; Hewitt Mfg. Company, Chicago, Ill.; Milwaukee Brass & Copper Company, Milwaukee, Wis.; More, Jones & Co., St. Louis, Mo.

The estimated value of the properties of the companies to be taken over is upward of $5,200,000, of which quick assets alone amount to about $520,000.

It is proposed that the new corporation shall have a capital of $5,200,000, consisting of 18,000 shares of 7 per cent. cumulative preferred stock and of 34,000 shares of common stock of the par value of $100 each, all full paid and non-assessable.

The aggregate annual sales and net profits of the constituent companies, as shown by the balance sheets, are as follows:

Aggregate sales for the year 1896	$2,068,719.49
Aggregate net profits for the year 1896	171,160.28
Aggregate sales for the year 1897	2,110,707.48
Aggregate net profits for the year 1897	179,983.14
Aggregate sales for the year 1898	2,950,971.23
Aggregate net profits for the year 1898	218,529.89

The net profits of last year, $218,529, are alone sufficient to pay dividends on the proposed issue of capital stock of the new company, as follows:

7 per cent. on $1,750,000 preferred stock	$122,500
2.824 per cent. on $3,400,000 common stock	96,029
Total	$218,529

It will be noticed that the net profits of 1898—namely, $218,529—are sufficient to pay 12 4-10 per cent. upon the proposed issue of preferred stock.

The savings and advantages from consolidation, it is estimated, will annually approximate $300,000. Statements for the first four months of this year have been submitted by the concerns named above, and it is said that in the aggregate they would have been able to declare a 7 per cent. dividend on the basis of the proposed issue of stock.

The following named persons, most of whom have been actively engaged in, and all of whom have been identified with, the business of the constituent companies, have consented to become members of the Board of Directors of the Standard Metal Company:

William J. Watson, president of the Hewitt Mfg. Company and vice-president of the Metropolitan National Bank, Chicago, Ill.

Gen. Charles Miller, president Clover Leaf Railroad Company, director Lake Shore and other railroad companies, and president Galena Oil Company.

Jules E. French, president of the Steel Tired Wheel Company, New York City, and identified with the Brady Metal Company, Jersey City, N. J.

Charles N. Finch of Swan & Finch, oil merchants, New York, N. Y., treasurer of the Blunt Mfg. Company, Newark, N. J.

Millard T. Conklin, general manager of the Fulton Iron & Engine Works, Detroit, Mich.

Geo. N. Sceets, president of the Milwaukee Brass & Copper Company of Milwaukee, Wis.

H. H. Hewitt, president of the Buffalo Brass Company, Buffalo, N. Y.

Paul S. Reeves of Paul S. Reeves & Son, Philadelphia, Pa.

C. M. Hewitt, general manager of the Hewitt Mfg. Company, Chicago, Ill.

Edward A. More of More, Jones & Co., St. Louis, Mo.

Geo. A. McLean, iron merchant, president of the Damascus Bronze Company, Pittsburgh, Pa.

Gen. Charles Miller of Franklin, Pa., has consented to accept the presidency of the new corporation.

Recent rumors in the trade are to the effect that the promoters are encountering difficulty in perfecting the consolidation. It is stated that More, Jones & Co., St. Louis, Mo., have withdrawn from the proposition. Other members of the trade state that should this concern withdraw the company will be formed with a smaller capitalization. We understand that options on the various plants have been extended to July 1 of this year.

Iron and Industrial Stocks.

The stock market continues narrow and professional. Lighter sales and declining prices mark the week's general record. The Steel & Wire, Federal Steel, National Steel and Steel Hoop show decreases in sales, approximating one-half or more. Tennessee Coal & Iron on Wednesday was active and firm on reports that with the expiration of the work on the old contracts the company's earnings would show a large increase.

Closing quotations on a number of industrial stocks are as follows:

International Silver, Common	17
Mich.-Peninsular Car, First 5s	113
Otis Elevator, Common	38
Otis Elevator, Preferred	89
H. R. Worthington, Common	50
H. R. Worthington, Preferred	112
Cramp's Shipyard Stock	80
Pratt & Whitney, Common	3½
Pratt & Whitney, Preferred	38
E. W. Bliss, Common	138
E. W. Bliss, Preferred	125
U. S. Projectile	90
Barner & Smith Car, Common	25
Barney & Smith Car, Preferred	95
Park Steel Co	109
American Car & Foundry Co., Common	21½
American Car & Foundry Co., Preferred	63½
International Pump, Preferred	66
Republic I. & S., Common	20
Republic I & S., Preferred	61
Tidewater Steel	8½

The Ashland Press Drill Company of Havana, Ill., have been incorporated with a capital of $30,000 by John E. Meyar, H. G. Buning and George W. Wessling.

The Colonial Iron Company.

A charter was granted during the last week to the Colonial Iron Company of Riddlesburg, Pa., by the Secretary of State of Pennsylvania. The new company are capitalized at $150,000 and the incorporators are Henry H. Adams of New York, Charles H. Scott of Pittsburgh, James F. Boor, L. B. Shaw and William E. Souders of Riddlesburg. The formal organization of the company will take place to morrow. The company have purchased iron ore and coal lands, together with the two Kemble blast furnaces located at Riddlesburg, Pa. These furnaces have for some time been turning out the Norway brand of foundry iron, which has been sold by Henry H. Adams & Co. of New York. Owing to changes which the properties were undergoing Mr. Adams was compelled to purchase the furnaces in order to maintain the control of their product. The furnaces will continue making this brand of iron. The property was sold at trustees' sale on April 15. Mr. Adams, who is the controlling stockholder in the Colonial Iron Company, was the purchaser. Among the other stockholders in the new company are several of the largest stockholders of the Huntingdon and Broad Top Mountain Railroad, which is a branch of the Pennsylvania Railroad running from Huntingdon to Maryland. The Kemble furnaces are numbered among the few that manufacture their own coke. Owing to their favorable location they were enabled to run through the late depression without interruption.

A Champion Krupp Process Plate.

There was recently tested in England by John Brown & Co., a plate manufactured by the Krupp process, representing part of the armor for the Japanese battle ship "Asahi," with the following results; the thickness of the plate being 8.8 inches, and the projectile used being 8-inch armor piercing, made by American Wheeler-Sterling process:

	Striking velocity.	Striking energy.
First round.....	1,859 feet per second.	5,991 foot-tons.
Second round.....	1,964 feet per second.	6,687 foot-tons.
Third round.....	2,039 feet per secodd.	7,308 foot-tons.

All the projectiles were completely shattered, the points of all three being welded into the plate. There were absolutely no cracks whatever, and the penetration was very slight.

As a comparison, a plate 9 inches in thickness, manufactured by the Harvey process, which is 0.2 inch thicker than the above Krupp plate, representing the turret armor for the United States battle ships "Kearsarge" and "Kentucky," was tested at the Indian Head Proving Grounds, with the following results; the projectile used being an 8-inch Wheeler-Sterling armor piercing: Striking velocity, 1734 feet per second; striking energy, 5217 foot-tons; penetration, 4.5 inches.

This is the best plate of this thickness of which there is any record, yet it will be readily seen how much inferior it is to the above mentioned Krupp plate.

At Pittsburgh the courts have handed down an opinion refusing to allow additional testimony, and overruling the exceptions to the account of the defendant company in the case of James Todd and others against C. Y. Wheeler and others. The action was brought to compel the defendants to account for a certain steel manufactured by them, which, it was contended, was identical with steel patented by the plaintiffs.

In furtherance of an enterprise to put all the coal and coke companies and coal elevators between Pittsburgh and New Orleans, along the Ohio and Mississippi rivers, under a single management, the Monongahela River Coal & Coke Company, three appraisers visited Cincinnati on Friday, May 19, and made a survey of the field. They were Peter Sprague, C. C. McIlvain of Pittsburgh and J. B. Finley of Monongahela City, Pa. From Cincinnati they went to New Orleans, where they will begin appraisements and work thence up stream to Pittsburgh.

At Pittsburgh the Philadelphia Natural Gas Company have filed an answer to the suit of the Clinton Iron & Steel Company, to recover $50,000 alleged damages by reason of the occupancy of their land by the gas company. The defendants state that they occupied the property by consent, and at the request of Graff, Bennett & Co., who owned the property in 1885, when the pipes were laid.

The A. French Spring Company of Pittsburgh have given their employees a voluntary advance of 10 per cent. in wages.

The New York Machinery Market.

Office of *The Iron Age*, 232-238 William street, New York, May 24, 1899.

Reports from all quarters of the machinery district are very favorable. Conditions are in fact quite unchanged. A good steady business continues at the advanced prices. During the last week this business has not included any especially large orders as far as we are informed, but has consisted of either small lots or single machines. The volume of this small trade is reported to have been sufficient to give a good tone to the market. The shops are reported to be still booked about four months in advance on standard lines. We hear that builders of the smaller sizes of drill presses are promising deliveries within four to six weeks. Other machine tools of standard designs but sizes for which there is not a constant demand are promised within about the same limit, while special automatic machinery is rarely promised before September delivery, and in certain instances is not obtainable before November. It is also very hard to obtain delivery on large planers prior to the month of November. It is quite evident that the tools which are being ordered now are being purchased through absolute necessity.

Mossberg & Granville of Providence, R. I., are sending out notification of a 10 per cent. advance in prices.

Under date of May 20 the Shafting Manufacturers' Association has notified the trade of another advance, which amounts to about 10 per cent. This brings the price of cold rolled shafting to about 3¼ to 3½ cents per pound.

A fair sized lot of lathes, shapers, grinders and other machine tools was purchased during the last week by the Department of Yards and Docks, Navy Department, for installation in the Brooklyn Navy Yard. It was another of the orders for the temporary machine shop. This purchasing is being done at the Navy Pay Office, Stewart Building, Chambers street and Broadway.

Advices from the West state that an addition will be built to the Bellaire factory of the National Enameling & Stamping Company of 78 Beekman street, New York, which will require the placing of considerable machinery.

The Pressed Steel Car Company, 71 Broadway, announce that they will enlarge the Fox plant at Joliet, Ill., to four times its present capacity. It will be recalled that this concern made very large purchases of machinery recently for the new plant which they are erecting at McKee's Rocks, Pa.

A 2000 horse-power boiler plant is being built by the Botany Mills, Passaic, N. J. We understand that return tubular boilers have been ordered and that Green Fuel Economizers have been purchased from the Fuel Economizer Company, Matteawan, N. Y., and 74 Cortlandt street.

We are informed that extensive additions will be built to the plant of D. M. Osborne & Co., Auburn, N. Y. The extensions will include new wood working department, boiler and engine plants and pumping station. An electric light plant will also be installed.

Plans are said to be on foot for the consolidation of large Portland cement factories in this country. The plants which it is said will be absorbed are those located at Buffalo, Akron, Sandusky, Castalia, Union City, Coldwater, Bronson, Chicago and Cleveland. Leedham White, Anthony White, R. Carling Styles and C. B. E. Chelfins of London are said to be promoting the deal. It is said that English capital will be used to buy the plants and that a large plant will be erected at Quincy, Ill.

An addition is being built to the plant of the Alpha Portland Cement Company, at Alpha, N. J. A new engine plant has just been installed. Contracts have been placed with the American Blower Company, 141 Broadway, for a ventilating apparatus to keep the engine room free from dust. A constant pressure of 1½ ounces is maintained in the engine room. When the door of the engine room is opened this pressure forces the dust away from the opening, which otherwise would menace the working of the engines. The American Blower Company have also been awarded contracts for a drying plant from the C. Heidt & Co. cooperage works, Jersey City, and for heating and ventilating systems for School 59, New York, and a new schoolhouse being built in East Orange. The former was received through Blake & Williams.

The Tubular Despatch Company, 195 Broadway, who own and operate the pneumatic mail transfer tubes in New York, have just placed an order with the Pneumatic Supply & Equipment Company, 120 Liberty street, for three duplex Corliss air compressors, to be installed in the Metropolitan Life Insurance Company's Building, 1 Madison avenue. The compressors will each have a capacity of 1300 cubic feet per minute, and the contract price is given as about $12,000.

The Pneumatic Tool Company have received an order from Shanghai, China, for eight pneumatic rivetters.

The Buffalo Forge Company, through their New York office, 39 and 41 Cortlandt street, received a contract for a

16 x 16 horizontal inclosed engine from B. O. Ellis & Co., 143 Liberty street. The engine is to be operated by the Bowery Bay Building & Improvement Company.

Promoters of the proposed consolidation of machine screw manufacturers have been in the East during the last week. It is said that nine plants will be taken into the combine. C. E. Roberts, president of the Chicago Screw Company, is one of the prime movers in the scheme. The Hartford Machine Screw Company and the Western Automatic Screw Company of Elyria, Ohio, and Hartford, Conn., have signified their intention of joining.

Percy A. Pickrell, 38 Wall street, reports progress in his efforts to consolidate the manufacturers of leather belting.

The Boston Blower Company having recently changed hands, De Witt T. Lyon and Walter G. Holmes have severed their connection with the company and have associated themselves with the New York Blower Company, manufacturers of all lines of blowers, exhausters, heaters, engines, &c. The New York Blower Company have large shops in Louisville, Ohio, which are now being equipped throughout with modern machinery, and which will be under the personal supervision of Walter G. Holmes, formerly superintendent of the Boston Blower Company. Offices have been secured at 39-41 Cortlandt street New York City, which will be in charge of De Witt T. Lyon, formerly New York manager for the Boston Blower Company. R. C. Penfield of J. W. Penfield & Son of Willoughby, Ohio, is president of the New York Blower Company.

The Philadelphia Machinery Market.

Office of *The Iron Age*, Forrest Building,
PHILADELPHIA, PA., May 22, 1899.

Machinery builders in this market have almost without exception experienced a brief lull in both inquiry and demand during a portion of the present month. Brief though it was it brought a small measure of relief to the somewhat congested shops in that it afforded a much needed oportunity to take up matters which had been of necessity shelved on account of more pressing demands. No one presumes to account for lulls in the trade in times like these, they seem to occur naturally and occasion no misgivings. The recovery in this case was rapid, and to-day orders are as plentiful as ever, and the inquiries even more voluminous.

There is a feeling in some quarters that a good deal of business has been hung up on account of the numerous consolidations which have been formed in many lines. This is no doubt the case. A great many improvements were contemplated in various textile mills, and a good deal of estimating has been going on for some time, but it is not expected that much will now come of it, at any rate for the present.

The difficulty in getting material is causing much uneasiness in some branches of the trade, and the prospect for a betterment of this condition in the near future is not very bright. Crane builders, makers of shafting and users of heavy forgings are much delayed in their work on this account. Foundries furnishing machine castings have all they can do to get out castings with anything like reasonable promptness, and prices are in consequence very much stronger.

Builders of machine tools have their shops crowded with work and deliveries are getting to be more and more extended. To say that they are picking their orders is but a mild way of expressing the situation. While business is not being actually turned down, long prices and longer deliveries are being named on such tools as cannot be booked to the best advantage, so that buyers are practically kept out of the market. Big tools take up a great deal of space, which could be used at greater profit for small and medium sized machines, so builders are not hankering after orders for them. The stock of tools on the floor at the permanent exhibition of machinery at the Bourse shows a large shrinkage when compared with the stock seen there a few months ago, which would indicate that stock resources have been heavily drawn upon. The foreign demand is still quite heavy, and would be enormous if the conditions attending specifications as regards deliveries could be met.

At Cramp's shipyards there is a vast amount of work in hand, and the facilities of the plant for getting out work are sorely taxed. More working space seems to be the cry, and it is understood that some large deals in adjacent real estate have been or are being put through. The new forge shop is almost completed, and its equipment is being installed. This shop when in working order will be a welcome addition to the plant.

At the Neafie & Levy Ship & Engine Building Company's plant all departments are exceedingly active, and work on several heavy contracts is being pushed forward with all possible speed.

The Harlan & Hollingsworth Company, Wilmington, Del., have plenty of work in their shipyards. There are, in all, ten boats in various stages of construction. The torpedo boat "Stringham" will be ready to launch next month. The frames of two torpedo destroyers are pretty well up. The steamer "Nantucket," for the Merchants' & Miners' Transportation Company, will be delivered inside of 30 days. The steamer "Ponce," which will run to Porto Rico, will be launched in about six weeks. The keel of its sister ship, "San Juan," has just been laid. The Red D steamer "Maracaibo" is under way, also a boat for the Winsor Line. Contracts have been signed within the last 30 days for two new steamers for the Ericsson Line. The equipment of the yards and shops has been materially increased of late, and a good deal of buying is still being done. Among the latest additions to the plant is a large gantry crane, installed by the Morgan Engineering Company.

The Pusey & Jones Company, Wilmington, Del., continue very busy in every department of their plant, covering shipbuilding, paper making and general machinery, foundry and boiler shops. The side wheel ferry boat "B. M. Shanley," for the Port Richmond & Bergen Point Ferry Company, is receiving the finishing touches, and will be dispatched to its destination next week. This boat is fitted up in the usual ferry boat style, according to the standard of the Pennsylvania Railroad Company's ferry boats. Dimensions, 140 feet long, 52 feet beam, 9 feet 11 inches depth, and is driven by a jet condensing beam engine 30 inches diameter, 9 foot stroke. They also have in construction two very handsome steam yachts, both of which are approaching the launching point. One of these is for J. Rogers Maxwell of New York City, and the other for Wm. Hesty, proprietor of the Brooklyn *Eagle*. These boats will be speedy, and will be handsomely finished in all respects, after the best style of pleasure yachts. In the machine shops is a large amount and a great variety of work in marine and other classes, including considerable machinery for paper mills. Great activity exists in the iron and brass foundries, especially in the former, many large castings being turned out daily. The boiler shop is also in line with the other departments, and among other work are some very large boilers, riveted and seamless, for use in pulp mills. The activity is general throughout the entire works, and the prospects are for still busier times for this establishment, both as regards domestic and foreign orders.

At Roach's shipyards, Chester, Pa., eight vessels are in hand altogether, four steam yachts of large size, two large steamships for the American Hawaiian Steamship Company, another for the Old Dominion Steamboat Company, and another for the Boston & Portland Steamship Company, to take the place of the "Portland," which foundered a short time ago.

The American Pulley Company are very busy at their plant on orders for their all wrought steel pulleys. They are about making a large shipment to Paris, France, and other shipments to Russia, Switzerland, England and Germany. They mention that their foreign business is growing rapidly, 30,000 pulleys having been shipped to Europe alone within the past eight months. Their business in general thus far for the year has been double that of last year for the corresponding period. The com pany have almost concluded negotiations for a property at Twenty-ninth and Bristol streets, at the angle formed by the Port Richmond branch of the Philadelphia & Reading Railway and the Chestnut Hill branch of the Pennsylvania Railroad. It is proposed to erect immediately a one-story building of brick and steel to cover about 50,000 square feet. Other buildings will be erected as required. Considerable in the way of new machinery is to be added, and the equipment when complete will allow of their turning out pulleys up to 42 inches diameter. The new plant has been long needed, their present quarters being entirely inadequate for their business. Beside making pulleys of much larger diameter than at present possible, the new plant will have facilities for turning out pressed work for other lines of business.

Israel Johnson, Jr., & Co., lathe builders, continue very busy, and have made a number of shipments during the month just past. Among the larger lathes shipped they mention a 60-inch by 34-foot engine lathe to the Midvale Steel Company, a duplicate of one supplied to that company early this year; and a 30-inch engine lathe to the Carbon Steel Company. They have a 42-inch lathe with long bed, almost ready for shipment, to Tod & Co., Youngstown, Ohio.

The Betts Machine Company, Wilmington, Del., are very busy in all departments. Among other orders in various stages of completion they mention one received from Dick, Kerr & Co., London, England, for a lot of machine tools, including six horizontal boring mills. These tools are to form part of the big electric plant and works at Preston, England, which a syndicate, represented by Dick, Kerr & Co., are building. It is understood that a Belgian concern have the contract for the building of the plant, under a guarantee to complete it in

six months, a much shorter period than was required by English builders. The Betts Company also have an order from the Standard Steel Works, Burnham, Pa., for 16 tire turning and boring mills of various sizes. These tools, with 14 of the same make already installed, will make 30 supplied to the concern by the Betts Company.

At the Henry R. Worthington Sales Agency some good business is reported for the past month. Prominent above other transactions stands the contract received for the two pressure pumps for the Roxborough pumping station of the City Water Department. Among other orders are mentioned one from the West Virginia Pulp & Paper Company, for a good sized pump for their new plant, at Covington, Va.; another from Harlan & Hollingsworth, Wilmington, Del., for a set of pumps for the Winsor Line steamer they are building, known as No. 4; and another from the Neafie & Levy Ship & Engine Building Company, Philadelphia, for several pumps for vessels which they are building.

The Abrasive Material Company, manufacturers of emery wheels, &c., have contracted for the erection of a large new brick factory building, 70 x 70 feet, and a power house for the same. The factory building is to be equipped with a quantity of new machinery and elevators.

J. W. Cregar, who represents a number of machinery builders on the exhibition floor of the Bourse, reports business unusually brisk. Among recent sales of machine tools he mentions one of some magnitude to Wm. Sellers & Co., Incorporated, Philadelphia, covering 15 Brown & Sharpe milling machines, two universal grinding machines, six screw machines, two surface grinders, two Becker vertical millers, one Gardner grinder, three Whitney Universal hand millers, and a Whitney tool grinder, and one covering a complement of Brown & Sharpe gear cutters, lathes, shapers, milling machines and smaller tools to the General Electric Automobile Company, Philadelphia. He has just sold an 18 x 24 automatic engine and two 220 horse-power boilers, an 8-foot wheel band log mill and auxiliaries, a small circular mill and 70-foot hack for 50-foot logs, a 12 x 14 automatic engine, and a 100 horse-power boiler for the new saw mill, at Lumberton, N. C. Mr. Cregar has an order for a 600 horse-power Corliss engine, to run 80 revolutions at a pressure of 130 pounds, with the necessary boilers, horizontal tubular preferred, a 72-inch lathe to take 25 feet between centers, a 30-inch geared slotter and a 6-foot radial drill, gear driven. He is inviting estimates from responsible builders for these tools.

The Leicester & Continental Mills Company, Germantown, are making extensive additions to their plant, at Cumberland and Armat streets. A large three-story brick building 200 feet long by 68 feet wide is going up, and a new dye house is to be built. A large quantity of new machinery will be installed in the plant.

The Otto Gas Engine Works continue very busy, their orders necessitating the running of their works overtime. They are meeting a big demand for small engines, both gas and gasoline. They have just shipped two 20 horse-power and one 30 horse-power gasoline engines to Yucatan, Mexico, for use in electric lighting.

The Trenton Malleable Iron Company, Trenton, N. J., have a quantity of orders in hand for Atlas metal machinery castings, as well as for castings for construction and electrical work. Atlas metal castings are finding much favor in machine shops, being easily machined and holding their strength throughout the mass.

A large plant for the manufacture of patent leather is to be located on the former McKay property, extending south from Oxford Pike to Summerdale Station. Stearns & Castor are the architects engaged on the plans.

Lucas & Gliem have booked some nice orders for cold saws and grinders during the past month. Although practically a new concern they have forged a way to the front rank of builders in their line. They have just completed and shipped a very large cold saw cutting off machine for the Frankford Steel Company, Ellwood City, Pa. It is to be used for cutting out the throws of large engine cranks, cutting throws up to 12 inches. It is especially designed for this work and weighs about 9 tons. The firm have been complimented on the working of the machine, and also on the exceedingly prompt delivery which they have made. The buyers have placed with the firm another order for a machine for cutting out 6-inch throws.

Estimates are being asked for the construction of the 17-story addition to the new building of the Real Estate Trust Company, southeast corner of Broad and Chestnut streets, and for the new Hallowell Building, of the same size. The structure will then be the largest office building in the city, 225 feet high, with a frontage on Chestnut street of 103 feet, and on Broad street 150 feet. These additions are to be fire proof, and put up on structural steel plans. Six more elevators are to be put in.

The Harrison Safety Boiler Works are crowded with work, mostly on orders for feed water heaters and separators. Recent orders for Cochrane feed water heaters and purifiers include orders from the Alcania Tin Plate Company, Avonmore, Pa., 1250 horse-power; Schoenhofer Brewing Company, Chicago, Ill., 150 horse-power; McCormick Harvesting Machine Company, one 3000 horse-power and one 2000 horse-power; Dayton, Xenia & Bellbrook Railway Company, Dayton, Ohio, 600 horse-power; The Lima-Honeoye Electric Light & Railroad Company, Honeoye Falls, N. Y., 350 horse-power; Cambridge Jail, Cambridge, Mass.; 500 horse-power, Special; E. Sutro & Co., Philadelphia, 150 horse-power, Special; Pennsylvania & New York Canal & Railroad Company, Sayre, Pa., 850 horse-power; American Cement Company, Coplay, Pa., 150 horse-power; Schwarzenbach, Huber & Co., Altoona, Pa., 1000 horse-power; University of Wisconsin, Madison, Wis., 200 horse-power. And for Cochrane separators orders from the Selvery Wyckoff Company, Springfield, Mass., 4-inch; McCormick Harvesting Machine Company, Chicago, two 10-inch; Vacuum Oil Company, one 14-inch, one 7-inch; M. J. Daly, Waterbury, Conn., 4-inch; Stewart Iron Company, Limited, Sharon, Pa., two 10-inch; J. B. Hill & Co., 5-inch; Cambridge Jail, Cambridge, Mass., two 10-inch, one 8-inch and one 7-inch; King Phillip Brewery, Fall River, Mass., one each, 2 and 4 inch; Braman, Dow & Co., Boston, 3½-inch; Dealers' Hygeia Ice Company, New York, 6-inch, oil-ammonia; Consumers' Ice & Cold Storage Company, Erie, Pa., 10-inch; Cochrane Chemical Company, Everett, Mass., 5-inch; National Steel Company, Youngstown, Ohio, two 8-inch, two 6-inch, three 5-inch, one 12-inch; Eastern Mfg. Company, South Brewer, Maine, 8-inch; Colgate & Co., Jersey City, two 2-inch; Chicago & Milwaukee Electric Railway Company, Highwood, Ill., one each, 8, 12 and 16 inch; National Tube Works, McKeesport, Pa., 4-inch; Howe & Davidson, Chicago, 4-inch, horizontal; Fred. W. Wolf Company, Chicago, 5-inch; Atlas Cement Company, Northampton, Pa., 5-inch, horizontal; Cheney Bros., South Manchester, Conn., 10-inch, &c.

Bids are in for an immense new building for the National Biscuit Company, to be erected at Thirteenth street and Germantown avenue. It is understood that the lowest bid was $200,000. The contract will be given out within a day or two, it is expected, and the building pushed rapidly to completion.

Alfred Box & Co., crane builders, are exceedingly busy at their works, orders for their make of cranes being very plentiful. Recent shipments include four 5-ton portable electric jib cranes and a 5-ton electric traveling crane for the General Electric Company; two 25-ton traveling cranes for the North Hudson Heat, Light & Power Company, Hoboken, N. J.; a 20-ton traveling crane for the Niagara Falls Power Company's station, at Niagara Falls, N. Y.; a 5-ton jib crane for the Richmond Locomotive & Machine Works, Richmond, Va., and a 5-ton jib crane for H. & W. Caskey, Newport News, Va. Among the orders in hand are orders from the General Electric Company for a 10-ton and two 6-ton electric cranes; a 10-ton electric crane for the Richmond Locomotive & Machine Works; a 5-ton jib crane for the New York Navy Yard; and system of tracks and six cranes, two of them electrically driven, two complete crane systems for the boat shop, and two electric crane systems for the boat storage building, of the Portsmouth, N. H., Navy Yard. They have also received an order for two 15-ton and one 30-ton cranes for the Metropolitan Street Railway Company, New York City.

Maris Bros., crane builders, are very busy at their works. Among the cranes in course of construction they mention a 15-ton hand traveling crane, to go to Pueblo, Mexico; a 15-ton hand traveling crane for Hoboken, N. J.; two 3-ton, one 10-ton and one 15-ton hand traveling cranes for the Baltimore Copper Company, Baltimore, Md.; a 2-ton pillar crane for the Washington Navy Yard; a 5½-ton electric crane for E. W. Bliss Company, Brooklyn, N. Y.; a 5-ton hand traveling crane for A. Falkenau, Philadelphia; two cranes and an overhead track system for the Frankford Arsenal, Philadelphia; a 6-ton jib crane destined for Chicago, and a 10-ton traveling crane to go to Baltimore, Md.

The Pedrick & Ayer Company have in hand some nice orders, mostly for pneumatic machinery and appliances. Among the orders booked they have one from the New York Car Heating & Safety Company for six compound steam driven gas compressors, a number of other compressors and a quantity of hoists. Inquiries for railroad tools are plentiful and sales very satisfactory in volume.

The Philadelphia Machine Tool Company are very busy on orders for presses. They have just shipped to the J. G. Brill Company, car builders, Philadelphia, a geared straight sided press of special design, with side cutter, weighing about 12,000 pounds. They have also furnished a 5000-pound press to the Kitson Heating & Incandescent Lighting Company, Philadelphia. They have a number of presses approaching completion which are to be shipped to Europe.

The J. W. Paxson Company, dealers in foundry machinery and supplies, report a good demand for machinery in their line. Among recent sales they mention one of a Groves gear molding machine to A. & F. Brown Company, New York.

The General Electric Automobile Company are equipping the large new factory building they have just secured at 4368 Ridge avenue, in this city. They have bought a quantity of new machinery for the plant, but have not yet made all their purchases. They will build electric delivery wagons, carriages and other vehicles, and will also make storage batteries.

The Pennsylvania Machine Company report business lively with them. They have just filled some orders of good size, and among them one from Sack Bros. of this city for a 38 horse-power boiler and a 20 horse-power engine, with a complete electroplating plant, for use in connection with their brass foundry.

The Midvale Steel Works are contemplating some extensive additions to their plant at Nicetown, which it is understood are to cover an open hearth plant and a new forge shop. They have for some time had recourse to an outside forge for a good deal of work, so that steps leading to extra provision for work of this character are not surprising. No authentic information is obtainable at the office of the company, but one or two concerns are making up estimates on equipment which would be needed in extensions of the character named, and steps have been taken toward having Schuyler street, near the works, extending from Roberts avenue to the Richmond branch of the Reading Railway, stricken from the city plan. The Council's Committee on Surveys visited the works last week in this connection, and a vacation of the street to permit of the proposed extensions is to be favorably recommended by the committee.

At the works of the Geo. V. Cresson Company there is much activity. Among the orders in their shipping department they have orders for the shafting equipment for three cotton mills in Mexico. They also have a nice order for shafting equipment from the Trenton Iron Company, Trenton, N. J. In their machinery department they are building some crushing rolls for the Arminius Company of Virginia, and a large dredge to go to a Western mining district.

David Stewart has awarded a contract for a five-story cracker factory, 186 x 80 feet, to be erected at Thirteenth and Hamilton streets.

The Link-Belt Engineering Company have a good deal of work in hand at their works, and are making some additions to better accommodate their business. They are about to erect an extension to their truss shop, 60 x 100 feet. Maris Bros. are supplying the crane, and a lot of new machinery has been ordered to go into the equipment. They have in hand a good deal of coal and coke handling machinery for the United Gas Improvement Company and Twenty-fifth Ward Gas Works. They are also building a lot of conveying and drying machinery for the Semet Solvay Company.

The Hilles & Jones Company, Wilmington, Del., have a new brick and steel building, 75 x 155 feet, approaching completion, which will be used as an erecting and machine shop. They are exceedingly busy at their works, and have some large orders in hand. They have an order covering a number of machines for the works of the Schoen Pressed Steel Company, Pittsburgh. They have just shipped a Duplex plate planing machine to the Navy Yard, at Port Royal, S. C., of unusually large size, 32 x 8 feet. For Moran Bros., Seattle, Wash., they are building a 24-foot plate planer, and three other plate planing machines.

The plant of Wm. Sellers & Co., Incorporated, is being operated to its fullest extent in the production of machine tools, cranes and special machines. The order bookings are very heavy, and cover several large machines. Some much needed additions to their plant are in contemplation, and work will be commenced on them very shortly.

The works of Bement, Miles & Co. are in the same condition as last reported, every department being run to the full extent of its capacity, with night forces in some departments. They are just shipping a very large gun lathe to Austria, and are finishing two others, which are also to go abroad.

Robt. Wetherill & Co., Chester, Pa., are very busy at their works, particularly in their boiler department. Their orders for Berry boilers within the past month include orders from the Harrisburg Electric Company, for two 250 horse-power.; Altoona Soap Mill Company, Altoona, Pa., three 150 horse-power; Standard Soap Company, Phillipsburg, Pa., three 250 horse-power; Isaac A. Sheppard & Co., Philadelphia, one 200 horse-power, and Folwell Bros. & Co., Philadelphia, three 300 horse-power.

The Philadelphia Roll & Machine Works report business very active with them. They have a great deal of work in hand for rolling mills, particularly rolls to replace others broken down in different mills. They are just shipping a 1-ton converter and 49-inch cupola to the Kelly Plow Company, Longview, Texas, as part of the plant necessary for the working of the Tropenas process for making steel castings, which is being introduced at Longview.

The Philadelphia Engineering Works are very busy and running on double turn. Quite a lot of blast furnace work is in hand, including a 20 x 70 foot hot blast stove for the Virginia Iron, Coal & Coke Company, Bristol, Tenn., and another of the same size for the Max Meadows, Va., furnaces of the same company, with other remodeling work for both furnaces. They are also remodeling the Carnegie Furnace, at Carnegie, Tenn. In their machinery department they are building three 20 x 24 Duplex Corliss engine air compressors to go into the Metropolitan Life Insurance Company's building in New York, for the Tubular Despatch Company. These compressors are for furnishing compressed air to move mails through pneumatic tubes. In their crane department they are building, among others, a 20-ton electric traveling crane for the Deutsche Niles Werkzeug Maschinen Fabrik, Berlin, Germany.

The influx of business to the Baldwin Locomotive Works continues. They have just taken an order from the Great Central Railway of England for 20 freight locomotives of the same design as those which they are building for the Midland Railway in that country, delivery to be made during the current year. The business booked so far during this year is very great. Last year 750 locomotives were turned out of the works, and although in point of numbers this was not so great a production as in 1889, 1890 or 1891, the tonnage was as great or greater as their best year, owing to the heavier type of engine demanded. This year the most conservative of estimates will show an increase of 25 to 33 1-3 per cent. on last year's production. The domestic demand for locomotives is very good, and likely to be even better as the summer advances.

Edwin Harrington Son & Co. are meeting an excellent demand for their lathes, drills and other machine tools. They are running full in every department of their works, and have enough orders in hand to keep them busy for some time.

The Main Belting Company, makers of the well-known Leviathan belting, report business good at their works. They are contemplating some substantial additions to their factory building, and expect to have them ready for occupation before the end of the year.

The Phœnix Bridge Company have a great deal of work going forward at their works, much of it to fill foreign orders. The business they are doing with foreign countries has grown to such an extent that hardly a week passes without an order from some point abroad. They have just received an order for another bridge of good size from Japan, and a few days ago received a cable order for six more single span bridges for the Chinese Eastern Railroad, making in all 18 bridges built by the company for that railroad.

The Cincinnati Machinery Market.

Office of *The Iron Age*, Pickering Building,
CINCINNATI, OHIO, May 20, 1899.

Outside of the movements in the matter of consolidation there has been but little going on in this vicinity worthy of special note. The excitement consequent upon the revival of general business has all passed away. Everybody almost without exception is busy running full time, paying advanced wages and months behind with orders. The iron working machine tool business is still the most active and is still attracting new capital. The general tone of trade is very steady, though there is no doubt that advancing prices are doing something to check business.

One of the most sweeping changes which has come to Cincinnati through the epidemic of consolidation in manufacturing circles is that which results from the absorption of the Laidlaw Dunn-Gordon Company by the International Steam Pump Company. The supply department of the Laidlaw Dunn-Gordon Company, which has been conducted in the company's building on the corner of Pearl and Plum streets, this city, has been sold to the Crane Company of Chicago, and henceforth the attention of the Cincinnati branch of the International Steam Pump Company will be devoted exclusively to the department of manufacturing. Since the purchase referred to the Crane Company have formed a partnership with the Geo. B. Hawley Company, dealers in plumbers' supplies, East Ninth street, this city. The new concern will be known as the Crane & Hawley Company, with branches in Cincinnati and Chicago.

The Laidlaw-Dunn-Gordon Company will retain their distinctive name in manufacturing, and with the exception of a down town salesroom will have all of their interests consolidated at their factory at Tweedvale. Superintendent Walter Laidlaw will remain in charge of the works and will also have general oversight over the salesroom down town. President Robert Laidlaw retires

from active management on June 1 and for the present will not engage in active business. He will soon sail for his old home in Scotland, where he will spend a several months' vacation. Secretary J. W. Dunn has gone to New York, where he takes an active part in the International Pump Company's affairs. The company are finding business excellent, and with the present prospects it seems not at all unlikely that the Tweedvale plant will be materially enlarged in the near future. Among some of the recent contracts taken by the company are the following: One large high duty pumping engine for the American Steel & Wire Company's Newburgh mill; a large contract of 13 pumps, condensers and air compressors for the Michigan Alkali Company, Wyandotte, Mich; three large air compressors for a Missouri lead mine; 13 pumps for the American Oak Leather Company's plant at Newport, Pa.; a large order of pumping machinery for the Ford Glass Company, Toledo; one large triplex electric pump for the new water works at College Hill, a suburb of Cincinnati. Foreign trade is excellent also, and besides the regular agency business with Norway, Sweden, Russia, China and other points they have just taken an order for eight large pumps to go to Copenhagen. Eleven pumps were shipped to Guadalajaro, Mexico, last week. An order for eight large pumps has been taken for a mining company at Calcutta.

Another consolidation which is of much interest to machine people is announced as nearly completed. It is the absorption by the Niles Tool Works of the Bement, Miles & Co. plant of Philadelphia. The new deal is looked upon as a virtual purchase by the Niles Company of the Philadelphia plant. The capitalization of the Niles Company is $2,000,000; that of the Pond Company was $500,000 and the value of the third plant is placed near $1,000,000. The new organization are to be capitalized at $6,000,000, one-half preferred and the other half common. Some little of the stock is to be placed on the market, as it is necessary to obtain a certain amount of cash with which to purchase some interests in the Bement, Miles & Co. concern which did not care to be identified with the new corporation.

The firm of Crawley & Johnston, who have been finding their old quarters on East Pearl street too cramped for their growing business and who from time to time have been overflowing their bounds and occupying adjoining premises, have just completed a deal for new quarters. Their new location is on the east side of Main street, just above Fifth. The Main street building will be occupied by their supply department. In the rear of this building they are erecting a commodious five-story structure, where their shops will be located. They make a specialty of steering machinery and have some recent patents which are proving winners in the general market. They are finding trade with steamboat interests excellent and are placing a number of valuable contracts for boat engines and machinery on their books. Their new quarters will be ready for occupancy by next fall.

R. K. Le Blond, who has now been running his new factory at Linwood, 6 miles out of Cincinnati proper, for six months, is remarkably well pleased with results so far. The shop, of which mention was made at the time of its commencing operations in *The Iron Age*, stands at the head of all machine tool shops in this section in the matter of light. The skylight arrangement is proving all that the architect claimed for it. Mr. Le Blond, who makes a specialty of lathes up to 20 inches, says that he has just doubled the output of his old shop and is finding new business exceedingly satisfactory. A large proportion of his product is now going East, partly for export through a regular agent. Business in the West has been gaining steadily, especially during the past four months, and in St. Louis and a few other Mississippi Valley cities the trade is now good.

The Bradford Mill Company report a strong, healthy business, with special activity on the part of their agents at Berlin, Vienna and Brussels. A shipment of four cars has just been made to these points. One carload was dispatched for London last week. In domestic trade their San Francisco and Chicago agents are doing excellently. The company have just made a large lathe for the Mare Island Navy Yard and are making a special lathe for the machine shop on board of the new battle ship "Wisconsin."

The Blymyer Mfg. Company, who make a specialty of sugar and coffee plantation machinery, are finding excellent returns for their efforts in Mexico and South America. Among recent shipments is one of $4000 worth of sugar mill machinery to be set up in Southern Mexico in a mill where the power is to be derived from a 30 foot overshot water wheel. They are also making a large stilling apparatus for a sugar plantation in Peru. The purchasers intend to use the still in producing alcohol from the sugar cane. A complete outfit of hullers, pulpers and driers for a large coffee plantation near Honolulu has also recently been shipped. The same order also included a 150 horse-power boiler and a 125 horse-power engine. The agencies established in Java and Bolivia some time since are now sending in a very satisfactory line of orders. The outlook for trade with Mexico and South America is excellent, and now, since exchange has fallen to 49, a great stimulus is given to business in those countries.

The Queen City Foundry Company, who for a number of years have been located on West Fifth street at the Big Four Railroad bridge, have decided to build and remove to more commodious quarters. They are now constructing brick buildings on the east side of Spring Grove avenue, near Alabama street. The foundry is to be 90 x 180 feet, with a wooden truss roof. It will be one story in hight. The office and pattern building will be in front of the foundry. It will be three stories in hight and fronts 100 feet on Spring Grove avenue by 40 feet in depth. The plant is to be equipped with a Whiting cupola and nine traveling cranes, of which one at least is to be operated by electricity. The capacity of the new place is to be three times greater than that of the old plant.

The Lane & Bodley Company, who it will be remembered were awarded the contract for the big pumps for the new Cincinnati water works, have just had their status in the case determined by the Ohio Supreme Court. The company were not the lowest bidders, though the board regarded their proposition the best all round contract for the city. After the award was made and the company had spent thousands of dollars upon preliminaries suit was brought to have their contract set aside and the work given to the lowest bidder. The court has just held that it was clearly within the discretionary powers of the awarding board to give the contract as they did. The company will now proceed with the work, making claim for the six or eight months' loss of time occasioned by the suit.

The Carnegie Steel Company.

The plan of organizing the merger of the Carnegie interests as a company with $100,000,000 bonds, $250,000,000 preferred stock at 106 and $275,000,000 common stock appears to have been abandoned. Mr. Frick has issued the following official statement:

"To set at rest the many erroneous reports regarding the capitalization of the proposed new Carnegie Steel Company, I desire to say that they will be distinctly a home concern, embracing only the Carnegie, the Frick and their allied interests, and using a Pennsylvania charter. The capital will be $250,000,000, and but one kind of stock will be issued, fixed upon an investment basis, so that the present management will take their holdings in the stock of the new company."

We understand that the plan on which the merger is now progressing is the only one with which Mr. Frick himself has been directly connected. There is to be but one kind of stock—namely, $250,000,000—which will be entitled to all dividends earned and declared, whatever they may be. This will be subject to $100,000,000 5 per cent. 50-year gold bonds. Out of the above issue of stock about $20,000,000 is to go to the treasury of the new company, which will take care of all balances on purchase money, mortgages and small balances of coke bonds that may be on the properties, and leave the new company with ample working capital.

It is reported in some quarters that possibly no public subscriptions may be called for, but if there should be it is probable that a complete statement of earnings, &c., will be issued. In that case it is likely that the stock holdings of the present partners may be trusteed for a fixed period. It is understood that the arrangement of the present company with the individual partners was that they were given a certain amount of the stock, on which they were charged interest, their share of annual profits being applied to the extinction of the debt. In the present company the right was reserved to acquire the stock at its book value at time of sale. In the case of a number of these partners the stock has not been fully paid for. Others are supposed in the trade to be eager to increase their holdings through subscriptions to the new stock, so that only little stock may be available to outsiders.

Substantially Mr. Carnegie sells his control of the stock, which is reported to have varied from time to time, but is stated lately to have been 54 per cent., for $100,000,000 5 per cent. bonds and a certain sum in cash.

A number of officers of some of the largest banks in New York are now in Pittsburgh, at the invitation of Mr. Frick, to look over the properties and familiarize themselves with the financial results.

HARDWARE.

Condition of Trade.

THE prominent features of trade which naturally obtrude themselves upon the attention of merchants and manufacturers are the continued advances in the Iron market, which are having their effect on the prices of manufactured commodities; the formation of trusts or consolidations in large numbers and with great capital, which have their influence in further advance in prices; the heavy demand for goods, which in certain lines is overtaxing the capacity of manufacturers, and a feeling of questioning as to how long this condition of things will last and what the final outcome of it will be. Meanwhile there is a confident and hopeful feeling among all classes, and the conviction that we are entering upon a prosperous time unless some unforeseen adverse influence sets in to disturb the existing promising state of affairs. The fact that foreign business is not only holding its own but giving indications of still further and rapid extension, is a matter to be regarded with special satisfaction, and notwithstanding the rise of prices here it appears likely that in most important lines we will be able to hold foreign markets which we possess in view of the fact that a higher range of prices is being established for many leading goods of English and Continental production. Reports from the different jobbing centers of the country indicate a very prosperous condition of things and jobbers are to an increasing extent realizing the profit which they are enabled to make in view of the advances in goods purchased at lower prices. There is, however, still a good deal of unevenness in this respect, and some houses are still pretty free in shading what would otherwise be the regular prices to the retail trade. The efforts of associations of jobbers, and especially of local associations, where the members are working together in harmony, accomplishes something in preventing cutting and in maintaining prices. Many manufacturers experience much difficulty in obtaining a sufficient supply of raw material, and some goods are advanced in price on this account, and are thus given a value which must be regarded as only temporary. Collections are, as a rule, excellent.

Chicago.

(By Telegraph.)

The weather s exerting some influence on the character of the Shelf Hardware trade. The past week has been unusually cold, and for two or three days the demand for certain classes of merchandise showed considerable falling off. It revived again, however, and the volume of business now appears to be fully up to what it was before. A particularly heavy movement is noted in Lawn Mowers and other grass goods, Refrigerators, Ice Cream Freezers and other seasonable articles in demand at this time. Jobbers report considerably larger sales of Lawn Mowers than during the entire season last year with several weeks of good business still to come. The price of Wire Cloth is advancing, and some jobbers here are now asking $1.50 for what they still have to sell. Strap and T Hinges have advanced during the week from 16 to 20 per cent., owing to the adoption of new discounts. Jobbers are quoting 9 cents base on 600-pound casks of Zinc. The high price of Galvanized Sheets is expected soon to have an effect on quite a large line of goods including Eaves Troughs, Conductor Pipes and domestic utensils. The demand for Aluminum Sheets has been extremely heavy owing to the high price of Copper and Brass and manufacturers are now far back in their deliveries. An improved demand is noted for the general line of Tinware as well as Metals and Roofing Material. The advance in the building season is bringing about an improvement in this respect. Heavy Hardware jobbers report a continued large volume of business covering everything they handle. Boat and small Track Spikes have been advanced $4 per ton. Chain is advancing sharply, almost every day bringing a new price.

St. Louis.

(By Telegraph.)

Great activity prevails in the agricultural districts and farmers are making strong efforts to further their work in the wake of a backward season. Some Implement makers say purchasing has been checked by the unseasonable weather conditions, but they are prepared to rush out supplies when buying begins. Sales of Forks, Rakes and Hoes have kept up with other metal goods and stocks are considerably run down. Lawn Tools, Sickles and Mowers are moving well, as weather has been extremely favorable to growth of grass. Complaint is made concerning Screen Goods that if deliveries are not more prompt consumers will retire from the market and countermanding of orders will take place. While jobbers' sales and purchases have been freely made, the present low temperature has checked the movement of Wire Screens, Doors and Wire Cloth in retailers' hands and relieved the pressure for the moment. Wire Nails are in moderate demand, while Barb Wire and Poultry Netting show good action. Prices on Black Sheets show stiffening and No. 27 is generally quoted at $3.25, although an occasional jobber cuts under that figure. Galvanized Sheets out of stock sell at 70 per cent. discount. Builders' Hardware is in unusually good demand and sales in general are satisfactory, with collections in gratifying condition. A strong advance is noted in Steel Butts and Strap and T Hinges, and in this connection an advance to 2 cents, base, has occurred in this market on Bar Iron in jobbers' stocks. The Heavy Hardware trade is actively engaged, but trouble is still experienced in hardwood supplies, and reports show that the cutting of new timber falls short of the consumers' needs.

Notes on Prices.

Wire Nails.—There is no special change in the situation on Wire Nails. Prices are steadily maintained and the market has a strong tone as a result of the condition of the Iron market, with its strong tendency toward higher prices. It is thought not unlikely that this will show itself in a further advance on Nails. Quotations are as before, f.o.b. Pittsburgh:

To jobbers in carload lots	$2.10
To " in less than carload lots	2.12½
To retailers in carload lots	2.20
To " in less than carload lots	2.30

In another column will be found a review of the condition of the market in Europe, where it will be seen that high prices are prevailing, with a scarcity in Rods and finished products.

New York.—There is a steady trade in Nails in the New York market and with the advance of the season there is an increase in business. The market is represented by the following quotations:

To retailers, carloads on dock	$2.30 to $2.35
To " less than carloads on dock	2.50
Small lots from store	2.55 to 2.60

Chicago, by Telegraph.—A little flurry was occasioned last week by the publication of a report in the daily papers that an advance of 15 cents was about to be made. This caused a renewal of purchases by jobbers, but the report was found unwarranted. The belief is strong in some quarters, however, that another advance is sure to come at an early day on account of the advancing prices of raw material. Jobbers report a fair volume of business for the season. Single carload orders are quoted at the equivalent of $2.35, Chicago. Small lots are selling at $2.45.

St. Louis, by Telegraph.—Moderate movement is taking place with no change in prices. Considerable buying was done by jobbers outside of the Iron and Hardware trades at the low prices of last year, and we understand that sales are taking place at a little under the prices of the regular trade. We quote carload lots to jobbers at $2.30, base, St. Louis; single cars at $2.40 and small lots at $2.50 from stock.

Pittsburgh.—The Wire Nail market is in the same condition as noted in this report last week. The tone of the market is strong and there is an excellent demand, both from jobbers and retailers. The Wire Nail mills are fully employed, shipping their product about as fast as made. We quote: To jobbers in carload lots, $2.10; to jobbers in less than carload lots, $2.12½; to retailers in carload lots, $2.20; to retailers in less than carload lots, $2.30, all f.o.b. Pittsburgh, with freight to destination added. As noted last week, the usual custom is to quote delivered prices.

Cut Nails.—The past week has been an uneventful one in the Cut Nail market. The mills in the East seem to be adhering faithfully to the established schedule of prices, which are as follows, f.o.b. Pittsburgh, freight being added to destination:

To jobbers in carload lots	$1.75
To " in less than carload lots	1.80
To retailers in carload lots	1.80
To " in less than carload lots	1.95

New York.—Reports in regard to the volume of business are very satisfactory and in some cases it is difficult to obtain Nails as promptly as called for and assortments are somewhat broken. Regular quotations are as follows: Carload lots on dock, New York, $1.90 to $1.95; small lots from store, $2.10.

Chicago, by Telegraph.—No change has taken place in the character of the business in this line, the movement being steady within narrow limits, with small lots selling at $1.90.

St. Louis, by Telegraph.—The local mills have made up a good stock and are prepared to supply quick demands. Sales do not vary greatly and base price for small lots in jobbers' hands is $2.

Pittsburgh.—The Cut Nail market is reported to be in very satisfactory condition. We quote at $1.75 in carload lots and $1.85 in less that carload lots, f.o.b. makers' mill, Wheeling.

Barb Wire.—Manufacturers continue to find difficulty in making shipments as promptly as called for by their customers. The trade for the season is evidently especially heavy and it is anticipated that former records will be broken. Prices are steady and firm, with something of an upward trend. Quotations continue unchanged, f.o.b. Pittsburgh:

To jobbers in carload lots, Painted	$2.20
" " " Galvanized	2.70
" in less than carload lots, Painted	2.22½
" " " " " Galvanized	2.72½
To retailers in carload lots, Painted	2.30
" " Galvanized	2.80
" in less than carload lots, Painted	2.40
" " " " " Galvanized	2.90

Chicago, by Telegraph.—The demand for Plain and Barb Wire is unusually heavy. Jobbers are particularly surprised at the quantity of Barb Wire now being drawn from their stocks by the retail trade. It had been expected that by this time the movement would have fallen to quite small proportions. Prices are firmly maintained at $2.20, Chicago, for single carload lots of Plain Annealed Wire, $2.45 for Plain Barb Wire and $2.95 for Galvanized Barb Wire. Jobbers' prices for small lots are 10 cents per 100 pounds above carload rates.

St. Louis, by Telegraph.—Customers are not wanting for Barb Wire and sales keep up to a comfortable state. Manufacturers quote equal to $2.40, St. Louis, for Painted in carload lots to jobbers. Single cars may be had of jobbers at $2.50, and smaller quantities at $2.60. Galvanized is quoted at an advance of 50 cents per 100 on prices above mentioned.

Pittsburgh.—There is a very heavy demand and the general condition of the Barb Wire market is reported to be very satisfactory. We quote at $2.20 for Painted in carload lots to jobbers and $2.30 to the small trade, with an advance of 50 cents for Galvanized, all f.o.b. Pittsburgh.

Smooth Wire.—A heavy business is also doing in Smooth Wire. This is owing to the new uses that are constantly being found for Wire and also to the extent to which Woven Wire Fencing is coming into requisition. Quotations are firm as follows, f.o.b. Pittsburgh:

To jobbers in carload lots	$1.95
To " in less than carload lots	1.97½
To retailers in carload lots	2.05
To " in less than carload lots	2.15

The charge for galvanizing is 50 cents on sizes from 6 to 14 inclusive; on Nos. 15 and 16 it is 85 cents and on Nos. 17 and 18 $1.10.

Pittsburgh.—The use of Smooth Wire is largely supplanting Barb Wire and the indications are that the tonnage this year in Smooth Wire will be much the largest of any year in the history of the trade. Prices are very firm, and we quote: Jobbers, $1.95; to smaller trade, carload lots, $2.05, and less than carload lots, $2.15. On Galvanized Plain Wire, all sizes up to and including No. 14, 50 cents advance; Nos. 15 and 16, 85 cents; 17 and 18, $1.10, all f.o.b. Pittsburgh, with freight tariff to destination added.

Wrought Iron Goods.—The manufacturers of Wrought Iron Goods are conferring with reference to a further advance in prices. The advance already made is referred to as being quite well maintained, with an active demand. They call attention to the fact that the increase in the cost of the raw material has not been covered by the advance in prices, and it would not be surprising if higher quotations were announced before long.

Taplin's Perfection Window Stop Adjuster.—The Taplin Mfg. Company, Forestville, Conn., have made an advance in the price of their Perfection Window Stop Adjuster on account of the increased cost of manufacturing it. The first discount on these goods is now 55 per cent. instead of 60 per cent. as heretofore.

Wrought Butts.—On account of the condition of the Iron market the manufacturers of Wrought Butts have made another advance in prices, which are announced by the McKinney Mfg. Company, Allegheny, Pa., in a circular dated May 20. In this circular, which relates to Bright Steel Butts and Strap and T-Hinges, the following revised base discounts on Butts are announced, applying to list of April 1, 1895:

Class No.	Discount, Per cent.	Class No.	Discount, Per cent.
700	66⅔	714	70, 10 & 10
703	66⅔	715	70
704	66⅔	717	70
705	66⅔	719	70
707	66⅔	721	70
709	66⅔	723	70
711	66⅔	724	70
713	70, 10 & 10	725	70

It will thus be seen that the base price on the following kinds of Wrought Butts has been made 66⅔ per cent. instead of 70 per cent. as heretofore: Narrow, Broad, Loose Joint, Table Hinges and Back Flaps. Advances are also made, it will be seen, in Light Parliament Loose Pin

Butts, Light Narrow Butts, Light Narrow Loose Pin Butts, Light Inside Blind Butts and Light Inside Blind Loose Pin Butts. Extra discounts according to the character of the trade continue, we understand, about as before. Similar action in advancing prices has been taken by the Stanley Works, New Britain, Conn., and 79 Chambers street, New York, but no discount sheet announcing it has as yet been issued. The tone of the market in these goods is very firm and the demand has been good.

Strap and T Hinges.—The following are the new base prices adopted by prominent manufacturers of Strap and T-Hinges, as announced by McKinney Mfg. Company, Allegheny, Pa., under date May 20, the discounts applying to list of March 15, 1898:

	Discount. Per cent
Light Strap	70 and 10
Heavy Strap	75 and 5
Light T	65
Heavy T	70
Extra Heavy T	70 and 10
Long Chest	55
Hinge Hasps	55
Crate Hinges	70 and 10
Crate Hasps	55

Stanley Works, New Britain, Conn., also unite in the adoption of the above prices. Extra discounts to the larger trade remain unchanged.

Egg Beaters.—The market for Egg Beaters continues firm, and with a prospect that the increased cost of the raw material will call for another advance. The marked advances which have taken place in Wire, flat and round, and the greatly increased cost of castings, are referred to as making Egg Beaters yield but a narrow margin of profit at present prices. The manufacturers also are working together with a good degree of harmony. A striking illustration of the extent to which prices on Hardware articles have fallen within a few years is illustrated in the fact that the Dover Egg Beaters when first introduced in 1871 were sold at $66 per gross, and for a number of years the price did not go below $40 a gross, while at the present time Egg Beaters of this pattern are obtainable at about $6 a gross.

Mrs. Potts' Sad Irons.—An advance of about 10 cents per set has been made by the different manufacturers of Mrs. Potts' Sad Irons.

Carriage Bolts, Machine Bolts, &c.—A meeting of the manufacturers of Carriage Bolts, Machine Bolts, &c., was held last week in Cleveland. There was some discussion in regard to the advisability of making an advance in prices, but this was not done, former prices being reaffirmed. The tone of the market is, however, very strong and some of the manufacturers are refusing to accept orders at the present prices. It is to be noted that the retail trade have been able to obtain the goods from the jobbers at prices lower than they would be entitled to if dealing direct with the manufacturers. The jobbers are, however, gradually raising their prices and endeavoring to realize a profit on their goods purchased when the market was lower rather than give it all away to their customers

Nuts.—A further advance has been made by the manufacturers of Nuts, whose prices are now as follows:

	Off List, Cents.
Hot Pressed Nuts, Square	5.70
" " Hexagon	6.30
Cold Pressed Nuts, Plain, Square	5.20
" " " Hexagon	5.30
" " C. T. & R. Nuts, Square	5.20
" " " " Hexagon	5.80

The above are the regularly announced prices of the manufacturers, a further abatement of 2-10 cent per pound being made on large lots,

Washers.—By the action of the manufacturers the price of Washers has been advanced and the quotation to large buyers is now 6 cents off list.

Agricultural Wrenches.—An advance has been made by the leading manufacturers of Agricultural Wrenches, whose quotation to the retail trade is represented by the range 75 and 5 to 75 and 10 per cent. discount. An advance has also been made in the price of the Bulldog and Alligator Wrenches.

Cordage.—Manufacturers' quotations on Rope remain unchanged on the basis of 9¾ cents for Manila, 7-16 inch and larger, and 8¾ cents for Sisal of corresponding size. Jobbers are shading these prices ⅛ to ¾ cent per pound. The following are manufacturers' quotations:

	Per pound, cents.
Manila, 7-16 inch and larger	9¾
" ⅝ inch	10¼
" ½ and 5-16 inch	10¾
Sisal, 7-16 inch and larger	8¾
" ⅝ in	9¼
" ½ and 5-16 inch	9¾
" Lath Yarn	8¼

Manila Tarred Rope, 15-thread, is quoted 9¾ cents, as is also Manila Hay Rope, Medium. The price of Jute Rope is 5⅛ cents.

Binder Twine.—There is little of interest to note regarding the Binder Twine market. Manufacturers continue busy running overtime on contract orders, and are not inclined to make concessions in price. Some jobbers are quoting lower figures on such grades as they have on hand, subject to stock. The quantity of Twine required to bind corn is increasing each year, and manufacturers are confident of a large demand for all purposes. Their quotations for carloads, f.o.b. Eastern factories, are as follows, with an advance of ¼ cent per pound for less quantities:

	Cents.
White Sisal, 500 feet to pound	9¾
Standard, 500 feet to pound	9¾
Manila, 600 feet to pound	10⅜
Pure Manila, 650 feet to pound	10⅞

Glass.—The American Glass Association has made a general advance of 5 per cent. on Glass. The extra rebate to qualified buyers is now 5 per cent. discount on single and 10 per cent. discount on double strength. The quantity of Glass allowed jobbers at the new rebate is so small that they would not be surprised at a further advance in the near future. The majority of the Glass factories will close down on May 29 and the situation will apparently be in the control of the combine during the coming months as far as price and supplying Glass are concerned. Reports regarding the new combine are conflicting from day to day. At one time it is an assured success and at another a dismal failure. It is assumed that reports are to some extent inspired by the parties interested to keep the public in doubt as to the real condition of affairs. New York, Philadelphia and Baltimore jobbers have advanced prices on small lots of Glass to 80 and 20 per cent. discount and to 85 per cent. discount for carload lots. French Glass is being quoted in New York at 80 and 10 per cent. discount. Business at this point is light, retailers preferring to cut up old Glass rather than pay advanced prices. The American Window Glass Association's prices are as follows:

Districts.	A.	B.	C.	E.
5000 boxes or more	85 & 5	85 & 5	.....	85 & 5
Carloads	80 & 20	80 & 20	85 & 2½	80 & 20
3000 boxes or more	85	85	.....	85 & 2½
1000 boxes or more	.....	.....	85 & 10	.....

These prices are subject to freight allowance.

Paints and Colors.—*White Lead.*—Former conditions obtain in the White Lead and Oil market. Demand continues satisfactory at previous prices, as follows: In lots of 500 pounds, 6¼ cents; 500 pounds or over, 5½ to 5¾ cents. There is a report in circulation that a movement is on foot looking to the consolidation of White Lead corroding concerns not included in the National White Lead Company. While it is said that the number of corroders likely to be included in the new combination is not large, their productive capacity combined is great enough to affect the market.

Oils.—*Linseed Oil.*—On May 19 city crushers reduced the price of Raw Linseed Oil 6 cents per gallon, making it 43 cents in lots of five barrels or more and 44 cents in less than five barrels. Boiled Oil is 2 cents per gallon advance. Raw State and Western Oil in absence of busi-

(Continued on page 49.)

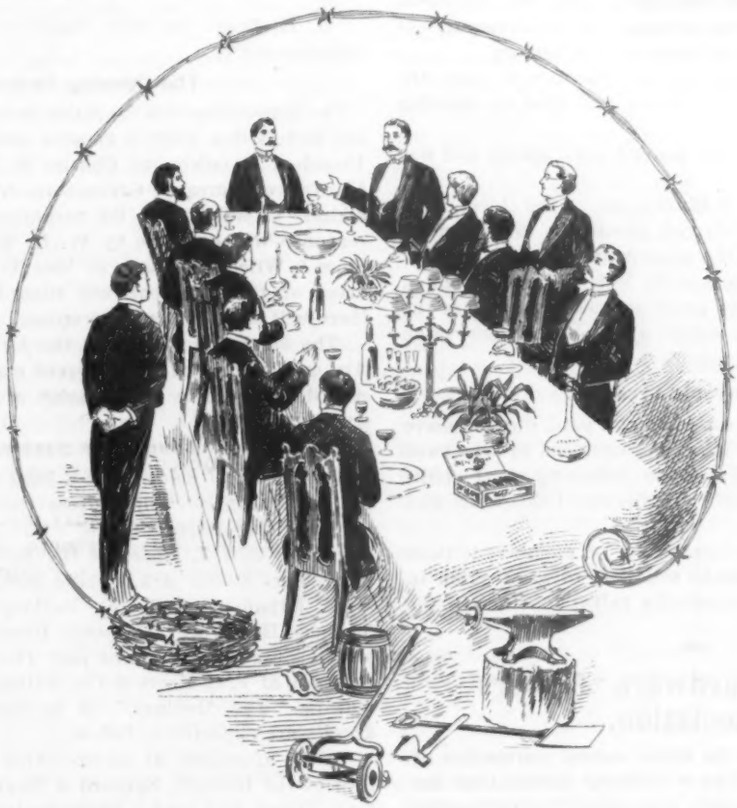
New York State Association of Hardware Jobbers.

A REGULAR meeting of the New York State Association of Hardware Jobbers took place at Utica on the 18th inst., it being the third held thus far during this, its eleventh year. Arrangements for the meeting were made by the resident members at the noted Fort Schuyler Club. A commodious parlor, finely furnished and with comfortable chairs surrounding a large oval table, provided all the needed conveniences for the business meeting, while the "open" fire place, with its cheering glow, gave a most comfortable atmosphere that was in marked contrast to the cold and wet out of doors.

Houses Represented.

The houses represented were:

Albany Hardware & Iron Company.
Barker, Rose & Clinton Company, Elmira, N. Y.
Irving D. Booth, Elmira, N. Y.
Burhans & Black Company, Syracuse, N. Y.
Syracuse Hardware & Iron Company, Syracuse, N. Y.
Mathews & Boucher, Rochester, N. Y.



Weaver, Palmer & Richmond, Rochester, N. Y.
Chas. Millar & Son, Utica, N. Y.
Wright, Dana & Co., Utica, N. Y.
Phelps, Straw & Co., Wilkes-Barre, Pa.
J. M. Warren & Co., Troy, N. Y.
Weed & Co., Buffalo, N. Y.

Letters were received and read from absentees who were unavoidably detained at home.

Chas. H. Turner, president, occupied the chair. The duties pertaining to his office were attended to by Secretary S. J. Weaver of Rochester. The regular routine order of business followed, consisting of reading of minutes of last meeting, communications and reports of committees, discussion of prices of leading articles in Hardware and Metals, new business, addresses, appointment of time and place of next meeting to follow the usual summer recess. Buffalo was selected as the place of the next meeting, on September 21.

A Cheerful Outlook.

The marked changes in prices of leading goods since the last meeting naturally were very noticeable, and the present tone of the market, together with the growing scarcity of home goods and the large volume of orders in manufacturers' hands, gave assurance of good prospects ahead for some time and a comfortable feeling of satisfaction for early purchasing of this season's wants. In fact, good feeling prevailed throughout the meeting for the pleasant condition of affairs now being realized by the Hardware jobbers.

Invited Guests.

Previous to the adjournment of the meeting there were introduced Howard M. Davis, representative of the American Tin Plate Company of Chicago, and W. D. Coles of the American Steel & Wire Company of Pittsburgh. These gentlemen had accepted invitations to attend this meeting and thus meet for a few hours a number of the houses with whom they have extensive business relations and who distribute so largely the products of their respective mills throughout the New York State territory. Introductions followed, and the words of welcome by the president were pleasantly responded to. Informal conversation between the members and the gentlemen representing these colossal manufacturing establishments followed and proved especially interesting.

George E. Dunham, editor and proprietor of the Utica *Daily Press*, and John C. Hoxie, president of the Utica Chamber of Commerce, were then presented, and after a brief interval the company repaired to the banquet room of the club, where a beautiful sight greeted the eye.

The Banquet.

A circular table decorated with cut flowers, smilax and ferns and lighted by softly shaded candles in silver banquet candelabra was so attractive as to signify at once that this feature of the meeting had been intrusted to proper hands. The *menus* were particularly handsome and elaborate. On the first page was a water color of a company of gentlemen at dinner, with appropriate pictures of Hardware articles worked into the design, including a reel of Barb Wire, a Saw, a Lawn Mower, an Anvil, a Hatchet, a Shovel and a keg of Nails. The dinner was excellent in point of cuisine and service.

Addresses.

Henry W. Millar filled the role of toastmaster, and first called on Mr. Turner, the president of the association, who spoke in complimentary phrases of local hospi-

tality, and referred appropriately to the work of the association.

George E. Dunham talked briefly about Utica and the city's representatives in the Hardware Association.

Howard Davis of the American Tin Plate Company said he did not represent a trust, but was more than glad to be present at a meeting of this association, and promised to come to all others when invited.

Mr. Boucher of Rochester said that he had made personal as well as business friends among the members of the association, and that the meetings were productive not only of enjoyment, but were generally of positive advantage and were of great value.

Mr. Coles of Pittsburgh denied being an orator, but joined in best wishes for the Hardware Association of New York.

Hobart Weed of Buffalo put in a good word for the Pan-American Exposition, with which he is prominently connected, and promised the visitors should hear some of the best music ever rendered in this country.

J. W. Black of Syracuse extolled the association and its advantages.

Captain Straw of Wilkes-Barre made one of the best speeches of the afternoon, pointing out the advantages of unity and harmony among business competitors.

George S. Dana spoke of the pleasure it gave the Uticans to entertain their guests and told an amusing story.

John C. Hoxie of Utica made a good speech and was applauded.

Capt. Fred. Barker of Elmira, one of the oldest members of the association, referred pleasantly to his experience in connection with the organization.

E. Z. Wright of Utica was the last speaker and one of the best. He referred to previous meetings both of the State and National Associations, and spoke of their value both in a social and business way.

An Enjoyable Occasion.

The company, which sat down at 2 p.m., did not leave the table until 5.30, and it was pronounced by all a most enjoyable and successful occasion, reflecting great credit upon the generous hospitality of the two Utica firms who were the entertainers.

Adieus were made and separation of members to their respective cities in the State followed, to meet again in September next, unless especially called together in the meantime.

Southern Hardware Jobbers' Association.

THE programme for the ninth annual convention of the Southern Hardware Jobbers' Association has just been issued. As already announced, the convention will be held at Atlantic City N. J., on June 14, 15 and 16, the ehadquarters of the association being at the Hotel Islesworth. Arrangements have been made for a very interesting and attractive meeting, and a general invitation is extended to manufacturers to be the guests of the association. A number of joint sessions will be held in which manufacturers and their representatives as well as the jobbers will participate, and several well-known manufacturers will make formal addresses.

Reception Committee.

Irby Bennett of the Winchester Repeating Arms Company has been selected as chairman of the Reception Committee, which comprises the following well-known members of the trade:

W. E. AUSTIN, Southern Agricultural Works.
GEORGE BROWN, Southern Plow Company.
C. L. CAMPBELL, Peck, Stow & Wilcox Company.
W. A. CHENOWETH, Henry Disston & Sons.
A. B. CLARKE, Old Dominion Iron & Nail Works Company.
F. F. CONNOR, Eberhard Mfg. Company.
TOM ELLIS, Hermann Boker & Co.
F. H. FORMAN, American Steel & Wire Company.
C. M. FOUCHE, Park, Brother & Co.
EDWARD H. GARCIA, Trenton Rubber Mfg. Company.
N. A. GLADDING. E. C. Atkins & Co.
T. H. GOSSETT, John H. Graham & Co.
J. H. GRUBB. Hussey, Binns & Co.
FRANK L. GUILDNER, Sargent & Co.
GEO. H. HARPER, National Stamping & Enameling Company.
J. M. HOTTEL, G. & H. Barnett Company.
W. P. HUDSON, Russell & Erwin Mfg. Company.
H. B. LUPTON, American Steel & Wire Company.
F. M. HUGGINS, Landers, Frary & Clark.
JAS. P. KELLY, Kelly Axe Mfg. Company.
C. T. MCKINNIE, Stanley Works.
GUY MITCHELL, Mallory-Wheeler Company.
V. A. MOORE, C. E. Jennings & Co.
W. D. MOUNGER, Michigan Stove Company.
E. E. PAINE. B. F. Avery & Sons.
H. RASHCOE. Nixdorff-Krein Mfg. Company.
HENRY F. REESE, Fairbanks Scale Company.
BANKS RUCKER, Russell & Erwin Mfg. Company.
J. F. SCHROEDER, Henry Keidel & Co.
FRED. SEELEY, Wiebusch & Hilger.
W. P. SMITH, J. C. McCarty & Co.
A. R. SULLIVAN, Towers & Sullivan Mfg. Company.
L. D. VOGEL, Charter Oak Stove & Range Company.
F. C. WHEELER, Hermann Boker & Co.
CHAS. H. WIER, Wier & Wilson.
C. K. WOODBURN, Warren McArthur.

H. H. Beers has been chosen to fill the position of sergeant-major.

The Opening Sessions.

The convention will be called to order on Wednesday, the 14th, when, after a general address of welcome by President Mandlebaum, Charles H. Ireland of the Odell Hardware Company, Greensboro, N. C., will deliver an address of welcome to the manufacturers present. The response will be made by W. R. Walkley of the Peck, Stow & Wilcox Company of New York. The annual address of the president will then follow, after which there will be an informal reception.

The afternoon session on the 14th will be an executive one, reports of the different committees being presented, followed by a discussion of the contents of the Question Box.

Thursday's Sessions.

On Thursday morning at a joint session W. H. Matthai of Baltimore will address the convention on the subject "Our Export Trade." Mr. Matthai will be followed by Cliff E. Speer of the Speer Hardware Company, Fort Smith, Ark., whose subject will be "Hardware Expansion;" T. W. Gathright of the May & Thomas Hardware Company, Birmingham, Ala., who will discuss "Associations and Their Effects," and V. C. Moore of V. C. Moore & Co., Atlanta, Ga., whose topic will be "The Medium." A number of informal addresses are expected to follow.

In the afternoon, at an executive session, W. L. Sanford of the Roberts, Sanford & Taylor Company, Sherman, Texas, will read a paper on the subject of "How Shall We Meet Foreign Competition and Secure the Trade of Our Legitimate Territory?"

Closing Sessions.

Another joint session will be held on the morning of the 16th, when the following addresses are called for by the programme:

"A General Talk," Geo. H. Barbour, Michigan Stove Company, Detroit, Mich.

"Equity as It Should Exist Between the Manufacturer and Jobber," R. C. Carson, Charlotte Hardware Company, Charlotte, N. C.

"Are Trusts Necessary Under Existing Circumstances, and Are They Detrimental to the Jobbers' Interests?" John Donnan. W. S. Donnan & Co., Richmond, Va.

"Our Prosperous Country," C. T. Boynton, American Steel & Wire Company, Chicago, Ill.

"My Friend. the Business Man," Jas. H. Kennedy, editor *Hardware.*

"XXth Century Progress," Daniel Stern, *American Artisan.*

"The Development of the Southern Hardware Trade," W. H. Wilson, *The Tradesman.*

"The Trade Journal as a Developer of Closer Commercial Relations Between the Jobbers and Retailers," W. S. Hemby, editor *Iron and Steel.*

"The General Progress of the South," R. H. Edmonds, editor *Manufacturers' Record.*

"The Beneficial Results of Associations," R. R. Williams, Hardware editor *The Iron Age.*

The afternoon session on Friday will also be a joint gathering and open discussion of the following questions is proposed by the Executive Committee:

"How Can the Buyer Do Justice to Himself and Please All the Traveling Salesmen Who Come to Sell Him?"

"Can a Manufacturer Sell a Jobber and Retail Merchant in the Same Territory and Conserve Both Interests?"

"The Difficulties in the Way of Maintaining Uniform Prices for the Year 1899 and Best Methods to Obviate Them."

"Should Manufacturers of Standard Brands of Goods Sell Their Products to Catalogue Houses and Department Stores?"

"If a Traveling Man Cannot Place His Line in a City, Has He the Privilege to Go to the Consumer to Sell His Goods?"

The closing session will be of an executive character, during which miscellaneous business will receive attention, reports of special committees presented, officers elected for the next year and place for next convention determined.

The programme is thus an elaborate one and should not fail to prove entertaining and instructive. Special rates have been secured at the Hotel Islesworth for those who attend the convention at $2.50 per day, without private bath, and $3.50 with bath.

Trade in Belgium—Wire, Nails, and Hardware.

From a Special Correspondent.

Wire and Wire Nails.

WIRE RODS.—The position of the Wire and Wire Nail trade in Belgium and Germany is difficult on account of the great demand at present and of the scarcity and high price of Wire Rods just now. Here in Belgium at the present moment 18 francs to 18 francs 50 centimes per 100 kilos is being asked for Rods.

AMERICAN MARKET.—As far as exporting Wire and Wire Nails from Belgium to America is concerned, at present I do not see any chance of this, as works are too full of orders for their ordinary markets to think of cultivating the American market, which, in any case, could only be a temporary market.

In Germany the Wire Nail business is syndicated. Possibly among the various makers there there may be some who may be able to export Wire Nails, but I do not think they would Wire, and certainly not Wire Rods, as these latter are too scarce just now.

PRICES ADVANCING.—Prices here are advancing, and Wire Nails for export to England and colonies are being sold at a basis price of 8 shillings and 3 pence in bags, 8 shillings and 6 pence to 8 shillings and 9 pence in kegs, 0.7, B.W.G., f.o.b. Antwerp, for 112 pounds Nails, and there seems every possibility of further advances. Bright Wire fetches 0 to 9 B.W.G. 7 shillings and 6 pence per 112 pounds, f.o.b. Antwerp.

THE OUTLOOK.—As to the future, it is hard to say what may arrive. A great deal depends on the course of events in America. It is quite possible the demand for the home trade both in America and on the Continent may slow off during the summer months, and this may bring prices down.

AMERICAN COMPETITION.—We find American Nails competing with us very much among the larger buyers in Japan, China, Australia and New Zealand, and at times in England.

As to the talk of an alliance between the American Steel & Wire Company and the Continental makers of Wire Nails, it would be very difficult to bring this about, as here in Belgium the makers are not able to combine among themselves for the home trade even.

American Machinery.

The demand for American Machinery is very much on the increase. A good business can be done here in Machines for making Nails, especially Wire Nails, Machines for Bolts and Nuts, and in general metal working.

American Hardware.

In American Hardware the business stands on a firm basis and is on the increase, and owing to the small import duty here (15 per cent.) Belgium is a very good market for American Hardware, which one sees on all sides. Hay Forks, Lawn Mowers, Hand Saws, Scythe Stones, Files, Builders' Hardware, Fine Tools, &c., these are to be found in all the principal Hardware stores.

BICYCLE PARTS.—In Bicycle Parts, Pedals, Hubs and component parts, the demand is very great here, and the duty 12 per cent. only. The principal makers of these goods are nearly as well known here as in America.

BICYCLES.—The demand for complete wheels is slower, but the reason is not far to look for, as there are quite a number of small makers here who make up complete wheels from American imported component parts.

Australian Axe and Saw Competitions.

FOR many years past trials of skill by the members have been an interesting feature of the annual gatherings of the United Australian Axemen's Association. There are said to be no finer axemen and sawyers in the world than some of the members of this association. This year the meeting will possess unusual importance and interest from the fact that it has been decided to make it the occasion of an international competition, in which the respective merits of British and American, and possibly also Swedish and German, Axes and Saws are to be submitted to stringent tests.

In a late issue of the London *Ironmonger*, alluding to the proposed competitions, reference is made to the fact that frequent complaints have been made of the preference shown for American Saws and Axes in the Australian colonies, and it is remarked that English manufacturers of these goods will now have an opportunity of showing beyond doubt the worth of their products. As giving a short summary of the conditions under which goods are to be admitted for competition, and the manner in which it will be conducted and the prizes offered, we make the following extracts from the article in the *Ironmonger:*

The locality of the test will be Ulverstone, a small town in Tasmania. . . . Gold medals are to be given to the manufacturers of the successful Axe and Saw. It is believed that all the important manufacturers in the world will be represented either direct or through their Australasian representatives. The entries for the contest, so far as manufacturers are concerned, have to be made through the *Australasian Ironmonger* not later than next month. The Axes and Saws must be sent to the association about three months before the annual meeting. Upon arrival the tools will be marked and given into the custody of the chairman of the association, Mr. Goold, who will personally sharpen them. While they are in his custody no agent or person other than officers of the association will be allowed to handle or inspect them in any way, but it will be open to any manufacturer to have the tools touched up and sharpened, either before arrival in Tasmania or in the colony itself, by any one else than Mr. Goold. The Axe and Saw competitions will be held on November 30, the second day of the meeting. . . .

As it has been suggested in some quarters that an inferior tool in the hands of a superior craftsman might carry the prize over a better tool in the hands of a less skillful man, it has been decided that the tests are to be made by teams of ten men each. Two leaders, or champions, will select their respective teams from the men on the ground, the choice of the men to be made turn and turn about. After the teams have been completed lots will be drawn for the choice of the tools, and the men who get through their logs in the shortest time will be declared the winners. All the timber to be used is to be supplied by the association, and will be of as nearly even quality as can be selected, each log running about 2 feet in diameter.

In addition to the four championship gold medals offered for Saws, Axes, Files and Axe Handles, a gold medal will be given for the best six dozen assorted Files and the best six dozen assorted Axe Handles. The entry in the two last named classes is to be free, but the Files and Handles are to remain the property of the association.

Trade Winning Methods.

This department will contain a description of approved methods of bringing customers to the store by means of newspaper advertising, circulars and such special expedients and methods as are found useful by enterprising and progressive Hardwaremen.

A cordial invitation is extended to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

A FLORIDA MERCHANT'S IDEA.

What would seem to be an unusual method of attracting attention to a certain store and identifying the merchant conducting it is adopted by William A. Morrison, Tampa, Fla. Mr. Morrison handles Hardware, Stoves, Tinware, Farming Tools, Lamps, Crockery, &c., as well as Doors, Sash and Blinds. The letters X Z he uses as a trade-mark, and it appears in a conspicuous place on his bill heads, cards, &c., as well as in his advertisements. The building occupied by him is also trade-marked in this way. In making up his advertisements for the local papers, of which there are three, Mr. Morrison advises us that he changes the matter presented two or three times a week, singling out some special line like Stoves, Freezers, &c. In the sample advertisement shown herewith it will be observed that

X. Z.

Wm. A. Morrison,

Crockery, Lamps, Etc.
STOVES. TINWARE.
Doors, Sash, Blinds.
HARDWARE. FARMING TOOLS.

Corner Franklin and Madison Streets.

TAMPA, FLA.

X The Light that Failed

What Light?

Most any Light except the one that Morrison sells. The best and cheapest. The user is independent of everybody.

Call and See It. Z

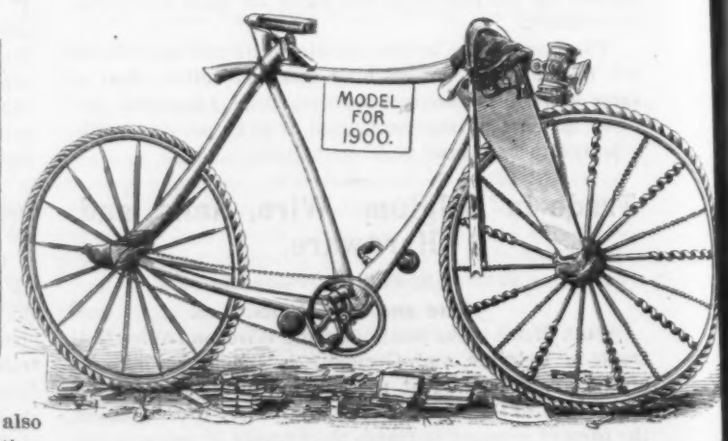
while his name is casually mentioned Mr. Morrison relies chiefly on his trade-mark letters to establish the identity of the advertiser.

A BICYCLE AS A TRADE WINNER.

Previous show window exhibits formed of Hardware articles taken from stock have been found by Andrew Hoffman, 5036 State street, Chicago, Ill., such a success as advertising attractions that he has recently constructed the Bicycle shown herewith, to carry on the good work which was done by the locomotive of which we gave a description a short time ago. It will be noticed by the accompanying illustration that the construction is extremely simple, and that the Bicycle is made up of comparatively few articles.

The tires are composed of ⅞-inch Manila Rope, fastened upon wood rims The spokes in the front wheel are Auger Bits while those in the rear wheel are square Files. The front sprocket is represented by a wheel of a pulley, and the rear one is a Tape Measure, with brass Sash Chain to connect the two sprockets. The frame is made of seven Axe Handles, and two 26-inch Hand Saws represent the front forks. The handle bars and handles are made of two Grass Hooks, fastened upon the Saw handles by tying them with two ribbons, which also serve as decorations. A Whitewash Brush does service as a seat.

The Bicycle was designed and constructed by Charles



Said to be a Trade Winner.

J. Beilfuss, bookkeeper for Mr. Hoffman. We are informed that the Locomotive designed by the same person, of which an illustrated description appeared in *The Iron Age*, May 4, 1899, was reproduced in a number of the Chicago papers.

Anything mechanical in design, and specially when it shows ingenuity in construction, is apt to appeal to the average man and becomes a subject of conversation among friends, thus bringing the merchant more prominently before the public. A Bicycle has interest for both young and old of both sexes, and the number of Bicycles which have been exhibited, of various construction, by Hardware stores, indicates the value which they are regarded as possessing for show window display.

Lufkin Rule Company.

LUFKIN RULE COMPANY, Saginaw, Mich., have enlarged their quarters in New York by taking adjoining space in the Stewart Building, which now gives them about three times the area they formerly had. When the manager of the business here, H. G. Hollis, took charge of the branch in this city a few years ago the stock carried was contained in a portable wardrobe used as a cupboard, the company making in addition to a line of board measures, &c., but one tape other than their pocket style. Now they make a comprehensive line of steel, metallic and linen tapes, which are largely handled through the wholesale trade and the higher grades specified for and bought directly by the United States Government. They also make folding steel pocket rules, tinners' rules and a number of specialties for measuring and gauging logs and lumber, farriers' rules, boards for glass cutting, log and cotton calipers, &c.

J. L. Blackburn has been admitted to partnership in the Hardware firm of R. T. Quisenberry & Son, Houstania, Mo., and the style has been changed to Quisenberry & Blackburn. The firm are making some improvements in their establishment, and expect to add materially to the stock carried before another year.

Notes on Prices.

(Continued from page 44.)

ness is quoted at 39 to 41 cents. This reduces the price of Oil to that ruling from March 9 to 14, this year, since which time it has been advancing. Buyers are pretty well supplied at lower prices and are not purchasing on a falling market. It is impossible to determine the future course of the market under present circumstances. Comparing the situation, however, with that of former years it is not considered impossible that a further slight decline in price may be followed by a reaction, and that before the new crop of Seed is due, about the middle of September, prices may approximate values in force last week. This, it will be recognized, is wholly conjecture.

Spirits Turpentine.—The conditions of the Turpentine market are about the same as last week, with prices unchanged at 41½ cents for Southerns and 42 cents for machine made barrels. Stocks at this point are sufficient for requirements, which are limited to small lots.

Pacific Coast Freights.

From a Special Correspondent.

SAN FRANCISCO, May 18, 1899.

THE fight that has been brewing for three weeks past between the big Hardware wholesalers of California, Oregon and Washington, and the bigger jobbers of St. Louis, St. Paul and Chicago for Western trade and the retail trade of intermediate points is now on in real earnest. A delegation of the larger dealers of this city will leave to-night for St. Paul, where a meeting has been arranged with the traffic managers. The wits of the biggest dealers of the West, backed by the Ogden and Southern railroad lines, are arrayed against the money, the brains and the influence of the immense firms of the East, in combination with the Great Northern and Northern Pacific Railroads. The contest is to be of no mean proportions.

Since it was first announced that the Northern Pacific and Great Northern had secretly made a new tariff on Western freight in less than carload lots for the benefit of the dealers of the Middle East, the merchants of this city have been holding almost daily meetings to devise ways and means to combat the powerful influence so quietly working against them.

That the two Northern roads had made rates inconsistent with the compact entered into by them last May with the other transcontinental lines was at first mere rumor and the agents of the local firms had the greatest difficulty in verifying it. The wholesalers of Portland, Tacoma, Seattle and Spokane were communicated with, and they entered into hearty co-operation with their Californian brethren, with the result that copies of the new tariff sheets were secured and the duplicity of the Northern lines proved.

San Francisco will be represented at St. Paul by W. R. Wheeler, manager for Holbrook, Merrill & Stetson and chairman of the Metal and Hardware Association; Charles F. Tay of the George H. Tay Company, H. D. Loveland of the California Wholesale Grocery Dealers' Association and Mr. Carrigan of the firm of Dunham, Carrigan & Hayden Company. Portland is sending a delegation of ten of her biggest business men, Seattle is sending six, Spokane two and Tacoma has a list of a half dozen or more.

Prescott Hardware Company, Prescott, Ark., suffered the loss of their storehouse by fire a short time since. The loss was $11,000, with insurance of about one-half. Warehouses with $6000 worth of stock were not damaged. Business was continued in temporary quarters, and the company are now rebuilding at the old site.

J. Gehrig, formerly of Alhambra, Ill., has purchased the Hardware store of Frank A. Warnhoff, 1712 Franklin avenue, St. Louis, Mo., and will continue the business.

The Standard Chain Company.

ALL indications point to an early consolidation of the principal chain manufacturing plants in the United States, under the name of the Standard Chain Company, with a capitalization of $6,500,000, $3,000,000 preferred and $3,500,000 common, the excess of common over the preferred going to the underwriters. The deal for the consolidation of the chain manufacturing plants was commenced a good while ago, the initiative being taken by J. M. Kelly, Jr., of Louisville, Ky., who secured options on the plants, and which have until July 1 to run. The banking concern handling the stock is the United States Mortgage & Trust Company of 59 Cedar street, New York city. In the Pittsburgh district the concerns to be included in the consolidation are the chain department of Jones & Laughlins, Limited; James McKay & Co.; Garland Chain Company, Rankin Station, Pa.; Baker Chain & Wagon Iron Mfg. Company, Allegheny, Pa. Outside the Pittsburgh district the following concerns will be included: William Woodhouse, Trenton, N. J.; John C. Schmidt & Co., York, Pa.; South Harrisburg Chain Company, Harrisburg, Pa.; Bower & Mallery, Carlisle, Pa.; McCoy & Linn, Milesburg, Pa.; P. Hayden Saddlery Hardware Company, Columbus, Ohio; Franz Krein Mfg. Company, St. Mary's, Ohio; Franz Krein Company, Marion, Ind.; Falls City Chain Company, Jeffersonville, Ind.; Nixdorff-Krein Mfg. Company, St. Louis, and Nes Chain Mfg. Company, York, Pa. In the case of Jones & Laughlins, Limited, it is understood that the Standard Chain Company will continue the manufacture of Chain at the Jones & Laughlins plant for 60 days, after which time the chain making machines and everything pertaining to the Chain plant is to be removed, the building thus vacated to be devoted to the manufacture of Cold Rolled Shafting by Jones & Laughlins. It is stated that this new concern have no connection whatever with the Union Steel & Chain Company, which are said to be in process of organization. It is also stated that the new prices on Chain sent out a week or two ago were dictated by the Standard Chain Company. It is also intimated that just as soon as the deal has been absolutely closed up the price of Chain will be further advanced.

Requests for Catalogues, &c.

HOMER E. HART'S store, at Stanwood, Iowa, was burned out a short time since. Mr. Hart is erecting a new one-story building, with basement, 25 x 70 feet, which he expects to have completed about June 25. His line comprises Shelf and Heavy Hardware, Stoves and Tinware and Sporting Goods, catalogues, price-lists, &c., relating to which he would be pleased to receive from the trade.

The store of Henry Jacobs, at Lead, S. D., was recently destroyed by fire. Mr. Jacobs has resumed business, and advises us that he would appreciate copies of catalogues and other matter pertaining to Shelf Hardware, Stoves and Tinware.

A. B. Cutting, Gouverneur, N. Y., will put in a new stock about June 1, and is desirous of receiving from manufacturers and jobbers catalogues and price-lists relating to Hardware, House Furnishing Goods, Steam and Plumbing Goods, &c.

Adolf Schleiffer, 42 Vogesenstr., Strasburg, Germany, mining, metallurgical and technical agent, would be pleased to hear from American manufacturers with copies of catalogues, &c., and information as to prices. Mr. Schleiffer advises us that he is in position to sell goods on commission in Southern Germany and France.

Price-Lists, Circulars, &c.

CRESCENT MACHINE COMPANY, Leetonia, Ohio: Wood Working Machinery, Threshermen's Tank Pump and Crescent Post Auger.

HELLER BROS. COMPANY, Newark, N. J.: Horse Rasps, Files, Farriers' Tools, Machinists' Hammers, &c.

THE BAY STATE ALUMINUM COMPANY, Quincy, Mass.: Aluminum Kitchen and Household Utensils.

Trade Items.

WILLIAM P. BISSELL of St. Paul, Minn., who has for years been prominently identified with the Nail and Wire trade, and is at present a representative of the American Steel & Wire Company, has been on a visit East and was in New York City during the past week.

R. F. PADDISON, well known to the Hardware trade in Arkansas, where he has traveled for many years, is now covering the State of South Carolina, in the interest of the Simmons Hardware Company, with headquarters at Columbia.

SOME weeks since we referred to the organization of the Rogers Screw Company, Providence, R. I., who have completed arrangements to enter the market in the near future. The modern plant of the Diamond Machine Company of Providence has been taken entire, and in a few months active operations will have begun. The capital of the company has been fully subscribed, and Olney Arnold, II, elected treasurer and secretary, and Henry R. Rogers, superintendent.

Among the Hardware Trade.

Pease-Humphrey Hardware Company, West Superior, Wis., who are wholesale and retail dealers in Heavy and Shelf Hardware, Iron, Stoves, Tinware, Mill and Miners' Supplies, Bicycle and Sporting Goods, Belting, &c., have materially enlarged their establishment by the addition of adjoining premises, 25 x 80 feet in dimensions. Taking out the partition wall they have a capacious store, 140 feet long, the principal part of which is 50 feet wide. The store has a 16-foot ceiling and has abundant light. A fine plate glass front has also been installed, adding materially to the exterior appearance. With the establishment as now arranged the company are in a much better position than ever before to meet the requirements of their growing trade.

Mr. Kline has disposed of his interest in the firm of Peterson & Kline, Oakland, Neb., to Wm. L. Peterson, and the business will be continued under the style of Peterson Bros. A $5000 stock of Shelf and Heavy Hardware, Stoves, &c., is carried.

Coffin & Northrop Company, Boise, Idaho, were burned out a short time since, suffering a loss on stock of about $25,000 and on building $3000. The company having come to a very satisfactory settlement with the insurance companies have rebuilt their store and are about to open up again in better shape than ever.

Truscott & Harmon, Miles City, Mont., have opened up a branch store at Rosebud, with J. Taylor as manager.

W. R. Grace & Son have succeeded Franck C. Lyon in the Hardware and furniture business at Wausa, Neb.

Lindsey Grimes has purchased the interest of Milton Hale in the Hale Hardware Company, West Union, Iowa.

W. G. Wilson has sold his store at West Bend, Iowa, to Joseph Dorweiler.

John H. Lecher, at Nanticoke, Pa., is erecting a new brick building for the accommodation of his Hardware business,

Berkey Bros., is the style of a new firm at Bolivar, Pa. They report a very fair spring trade. T. M. and T. L. Berkey comprise the firm.

J. S. Bradley, New Berlin, N. Y., is building an addition to his store. The addition will be 22 x 85 feet, with an ell, 17 x 30. It will be of brick and two stories high.

About $600 worth of goods were stolen from the store of Rogers & Miller, 135 Market street, Philadelphia, a short time since. No clue to the thieves has yet been secured.

Frank L. Bean has succeeded Wm. Vandermade in the Hardware, Stove and Sporting Goods business at Grand Rapids, Mich.

Dreher & Myers, Ney, Ohio, have put in a stock of Hardware in connection with their Harness and Agricultural Implement business.

John Rustad has admitted E. A. Lerberg to partnership in the Hardware business at Kindred, N. D., and the style has become John Rustad & Co.

W. W. Briggs has disposed of his business at Geneva, Ind., to J. W. Deitsch.

Bell & Patton are successors to Lightbourne & Brassfield at Liberty, Mo.

Frank C. Boise, Union City, Mich., has removed to larger and more commodious quarters. Here a number of improvements are noticeable, which Mr. Boise remarks have been suggested by an experience of 20 years in the Hardware line. Mr. Boise handles Stoves, Tinware, Agricultural Implements, Sporting Goods and Bicycles, Buggies, Wagons, &c., in addition to Shelf and Heavy Hardware.

Moses Korns, Hartwick, Iowa, recently turned over his Hardware business to his son, Clarence G. Korns, who disposed of a half-interest in it to J. E. Foulkes, who has been prominently identified with the store for the past ten years. The style of the firm is now Korns & Foulkes.

The Moore Hardware & Iron Company have succeeded J. M. Moore's Sons, Denver, Col., whose office and salesrooms are at the corner of Fifteenth and Wazee streets, with warehouse at corner of Thirteenth and Wazee streets. The company's stock includes Shelf and Heavy Hardware, Wagon Wood Stock, &c. Some retailing is done, but the business is largely wholesale, the company's salesmen covering Colorado, Wyoming and New Mexico.

Norman & Willey have succeeded Norman, Branstetter & Willey at De Witt, Ark.

Two hundred dollars' worth of goods were recently stolen from the store of Orr & Smith at Painted Post, N. Y.

The R. D. Willson Hardware Company, Port Angeles, Wash., have been incorporated with a capital stock of $15,000. Robert D. Willson is president of the company and A. D. Willson, secretary and treasurer. A wholesale and retail business is carried on in Hardware, Stoves, Tinware, Farm Implements, Sporting Goods, Furniture, Crockery, &c.

Carl Stroebel is successor to Fisk Bros., at Central Lake, Mich.

Mays & Crowe, The Dalles, Oregon, whose store was destroyed some time since in the large conflagration in that city, have rebuilt and are again conducting business as usual. Their new building is 100 feet square, two stories high, with plate glass front. The building is of pressed brick and is furnished with power elevator and lighted by nine arc lights. The fixtures are thoroughly modern and the store is regarded as exceedingly well arranged and admirably adapted to the requirements of the Hardware business. The building cost in the neighborhood of $30,000. The firm have also erected new plumbing and tin shops, also a machine and Bicycle repair shop. They also have a brick warehouse 50 x 120 feet in dimensions.

J. H. Hixson & Co., have succeeded B. S. Webb in the Hardware business at San Pedro, Cal.

Adam G. Robson has sold out his business at Camden, N. Y., to Becker & Maine.

Bailey & Son, Orion, Mich., have removed to larger and more commodious quarters.

Morton & Adam have dissolved partnership at Chatham, Ont., and John A. Morton is continuing the business under his own name.

Long & Harris are successors to Long & Moore at Chula, Mo.

Hager & Brother's store at Fort Atkinson, Wis., was robbed of $100 worth of Cutlery on the night of the 10th ult.

L. H. Hannas & Son have purchased the Hardware and grocery business of W. J. Crandall, Alhambra, Cal.

McCollum & Merriell have dissolved in the Hardware business at Hope, N. D., and J. K. McCollum is continuing under his own name.

Albertson & Young Company have succeeded Coty & Albertson Company at Atlantic City, N. J. This is referred to as a change in name only, the business being carried on under the same management as heretofore. Richard R. Albertson is president of the corporation, and Joseph Young secretary. The company are retailers of Hardware, Stoves, Tinware, House Furnishing Goods, Electrical Supplies, &c. They also conduct a plumbing and steam heating department.

S. T. Voorhees, with stores at Galena and Sturgis, S. D., lost his store at the former place by fire on the 14th ult., the loss being about $10,000. Mr. Voorhees promptly secured other quarters and was again in shape for business three days later.

Sedalia Hardware & Grocery Company, Sedalia, Mo., have removed to 104 and 106 East Fifth street, where they have a double store room, with three floors. The capital has recently been increased and the company are carrying a larger and more complete stock than ever before.

Isaac A. Brown, Monon, Ind., has disposed of his business to Galey Hardware Company.

Brady & Robinson, Grass Valley, Cal., have incorporated with a capital stock of $10,000. They do a retail business in Hardware, Stoves, Tinware, Farm Implements, Sporting Goods and Mine and Mill Supplies. They have recently added a fine shop for plumbing and metal work.

Newtson & Leemon have succeeded James M. Newtson at Hoopeston, Ill.

Miscellaneous Notes.

Hartz Steel Tackle Blocks.

H. D. Edwards & Co., Detroit, Mich., for whom Neal & Brinker are Eastern agents at 168 Church street, New York, in addition to the complete line of metal blocks formerly made by them, are now making and show in their new catalogue recently issued square cheek blocks for wire rope made with loose safety link hooks, stiff swivel hooks or shackles. These blocks are adapted to house moving and similar uses. The illustrations in the catalogue are half-tones, while the value of the publication is further enhanced by tables giving the strength of blocks, estimated weights and strength of cordage and wire rope, &c.

Wrought Iron Fire Escapes and Entrance Gates.

J. E. Bolles Iron & Wire Works, Detroit, Mich., manufacturers of iron, wire, steel, brass and electro-plated work, call especial attention to a variety of all wrought iron fire escapes, suitable for hotels, factories, public buildings, &c. In the No. 5 Michigan Standard style, shown in a small illustrated catalogue of their various goods just published, the especial features mentioned are strong balconies, usually made 36 inches in width, with a floor of 2 x 3-16 inch iron slats supported by three angle iron stringers. The railing also has a strong angle iron frame, the top rail of which, together with the brackets, are fastened securely through the wall with nut and washer on the inside, thus securing the greatest strength with a comparatively light construction. The balconies are usually made long enough to take in at least two windows. Where the wall space is not sufficient for stair ladders between the windows, a straight ladder is used, as shown in cut No. 7, extending from the roof to within 8 feet of the ground, and located a sufficient distance from the wall so that people can descend behind the ladder with comparative safety. The No. 14 stair escape is still another variety of structure, designed more particularly for school buildings, asylums, sanitariums, &c. This concern also make a large variety of fire escapes adapted to different purposes, as well as much ornamental iron, wire and brass work, elevator cages, &c., and have equipped many prominent buildings in this country. A new design in the way of entrance gates to grounds inclosed with stone walls or iron fences has just been brought out, and is shown in the catalogue referred to.

Samson Anvils.

Van Wagoner & Williams Hardware Company, Cleveland, Ohio, and 14 Warren street, New York, have added the following additional sizes to their line of Samson anvils: 275, 300, 325, 350, 375, 400, 425, 450, 475 and 500 pounds. The company suggest that the figures should be noted on page 45 of their catalogue for future reference.

Lunham & Moore, forwarding agents, 461 Produce Exchange, New York, have been appointed freight and passenger agents in the United States and Canada for the Lancashire & Yorkshire Railway, England, and are now prepared to quote closer rates than heretofore from f.o.b. steamer, New York, Boston, Philadelphia, Baltimore, Norfolk or Newport News to any station on the line of this important road and its connections. Rates will be given to the buyer's store covering all incidental charges.

Pullman Lawn Sprinkler.

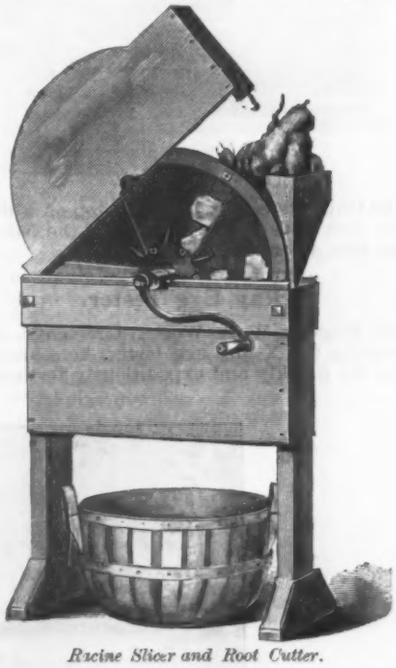
Pullman Sash Balance Company, Rochester, N. Y., for whom A. G. Sherman is agent, 14 Warren street, New York, are manufacturing the Pullman lawn sprinkler, as here illustrated. While similar in outward appearance to one formerly made, some modifications have been introduced with regard to the umbrella spray delivery. The nozzle and parts, except the black enameled sheet steel stand, are made of nickeled cast brass. In addition to the sprinkler as here illustrated it can be used on the end of a hose for spraying bushes, shrubbery, &c., by removing the upper portion and attaching the tip directly to the

Pullman Lawn Sprinkler.

hose, in the same way as an ordinary nozzle. A steel pin 3-16 x 4 inches in size is also sent with each sprinkler, so that one end, which is threaded, can be screwed into the brass work underneath and the spike stuck into the ground on terraces or other angular or uneven places, where the stand would not be level. In such cases the stand can be removed quickly, if necessary, or used as it is.

The Racine Slicer.

The slicing machine, for slicing potatoes and all kinds of roots, for stock, cutting cabbage, &c., which is herewith illustrated, is manufactured by the Racine Malle-



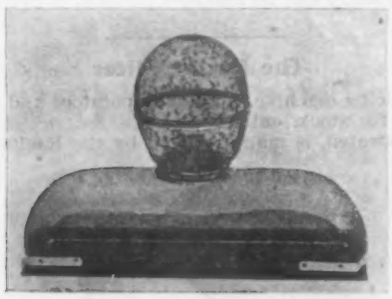
Racine Slicer and Root Cutter.

ble & Wrought Iron Company, Racine, Wis. It is compactly built and simple in operation. The knives are capable of adjustment to thick or thin slicing. Its rapidity of operation will be appreciated in those sections of the country in which roots are largely fed to stock.

We learn from the Nicholson File Company that the "File Filosophy," which was published two months ago, has proved so popular that a second and much increased edition is rendered necessary. The little book has been widely distributed to machinists and file users throughout this country and abroad. Treating as it does of files and how to use them it is useful to those interested in that class of tools. Copies may be had free upon application to the company's head office in Providence, R. I.

Newton Fly Catcher.

H. C. Newton & Co., Cuthbert, Ga., are manufacturing Newton's fly catcher, as here illustrated. It consists of a baseboard and wire superstructure, which when baited with a little syrup or other fly food and placed a short distance away from a kitchen or dining table with a light overhead, is ready for business. In setting it after

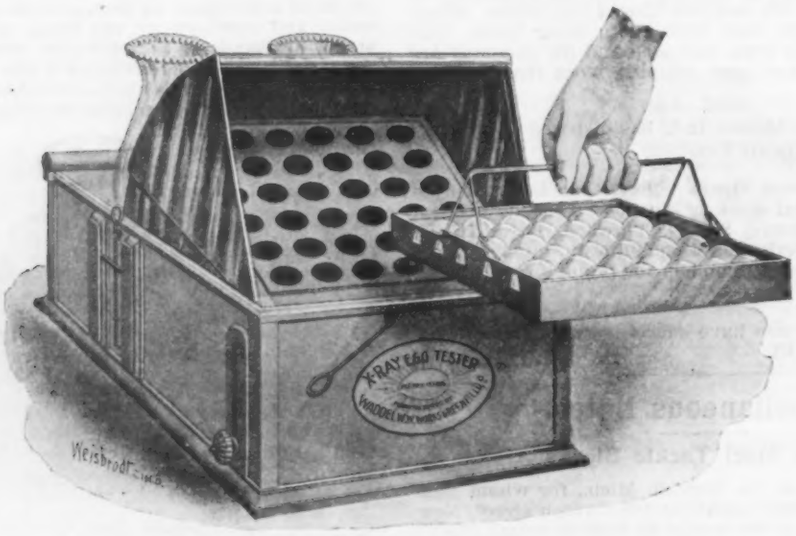


Newton Fly Catcher.

baiting the trap it is best to leave the top off a little while until some flies have found the way to the bait. In this way other flies are more readily caught.

X Ray Egg Tester.

Waddel Wooden Ware Works, Greenfield, Ohio, are manufacturing the X Ray egg tester, here shown. This is a device for quickly and expeditiously testing eggs before packing for market, accomplishing in a larger and quicker way the results usually obtained by candling. The cabinet illustrated is made of wood, well finished and painted. It is 14 inches wide, 22 inches long and 8 inches high. The hood is made of IXX bright tin, black enameled and in two sections, so arranged as to telescope, so it may be folded back into the cabinet when not in use. A heavy tin lamp or vessel, with a capacity of half a gallon, provided with two No. 3 burners, is securely pivoted on the rear of the cabinet in such a way that it swings freely and adjusts itself to an upright position when the tester is elevated in front. The lamp can be filled through a screw cap without removing from the tester. There are adjustable legs, one on each side of the cabinet, for elevating the apparatus to the proper hight for the operator. The tray is made of sheet steel and perforated with 36 holes, the proper size for the end of an egg to rest in, and is secured to the inner section of the metal hood. The carrier is made of heavy sheet steel with pivoted wire rods. Reflectors at each end of the cabinet intensify the light under the tray. The lever shown in front of the cabinet elevates the eggs from the tray into the carrier, the arrangement being such that by distending the wire handles the eggs are in one movement simultaneously deposited in the cardboard receptacles in the carrier. Complete, the tester weighs 11 pounds. Where electric light is available, it can be substituted for the kerosene lamps. With each tester an electric lamp holder is sent.



X Ray Egg Tester.

Special Features of Monarch Bicycles.

The wheels brought out this season by the Monarch Cycle Mfg. Company, Lake and Halstead streets, Chicago, have a number of new and interesting features. Several of them are illustrated herewith. The crank shaft mechanism illustrated in Fig. 1 is covered by strong patents which are owned by the company and it is used exclusively in Monarch bicycles. It is of the two piece or middle union type, and the union of cranks is so nearly mechanically perfect that when united they are practically one piece; yet both cranks and sprockets can be instantly removed from the machine without disconnecting the chain or disturbing the adjustment of the bearings. The cranks are steel drop forgings, with a portion of the axle forged on each crank. They are firmly locked together

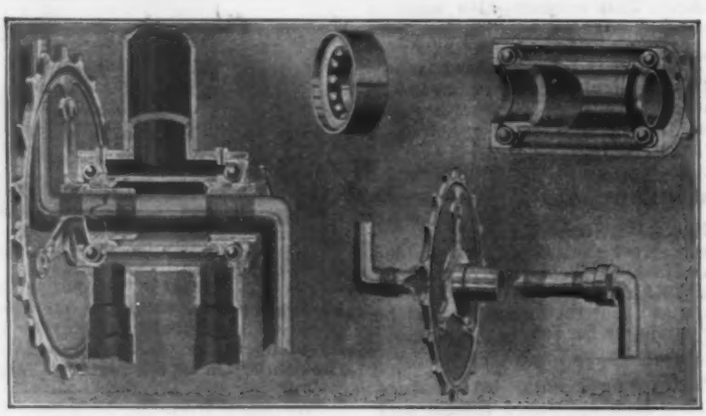


Fig. 1.—Crank Shaft Mechanism.

by a sleeve containing differential threads—*i.e.*, threads of different pitch, but both right hand, so that when this sleeve, which also serves as a hub for the sprocket and spider, is revolved on both cranks at the same time it draws them together. The inner ends of the cranks are accurately machined, one with a tapered tongue and the other with a corresponding tapered groove, so that when

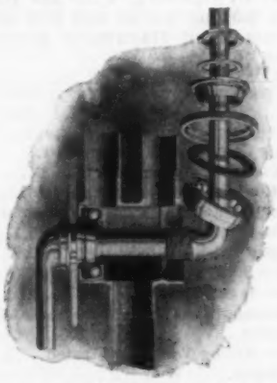


Fig. 2.—One-Piece Crank Axle.

drawn together, as above described, they are firmly locked in their proper relative position.

The left crank, which forms the long part of the crank axle, has a lock nut attached having a right hand thread, 28 threads to the inch. The interlocking point of the left crank has a right hand thread, 20 threads to the inch. From this it will be seen that in back pedaling the sprocket sleeve would have to travel toward the lock nut (inward) at the rate of 1-20 inch to one revolution, while the lock nut will travel in the same direction only 1-22 inch, thereby forming a locking device for restraining sprocket from loosening by drawing against the shoulders of either sprocket sleeve and lock nut.

The right crank, forming short end of axle, has a ten per inch right hand thread, cut double, and this thread travels 1-10 inch to one revolution. In pedaling forward it will be seen that the right hand crank will travel toward the left hand crank twice as fast as the left hand crank travels, thereby forming a lock between the two. The tapered tongue and groove on cranks unite them so that they must travel as one member. The crank hanger or bracket is machined from forged steel. The joints at this point are flushed and reinforced in the most scientific manner. The ball cups contain ball retainers and are threaded to the crank hanger and fit flush with the ends, being secured in place by bolts and binding lugs forged on the bracket. Periphery of ball cups is much wider than old patterns, making it impossible for them to get out of adjustment after having been locked by clamping device. The cones are connected by a sleeve which ensheaths the axle, one cone being pressed into either end of the sleeve. The balls used in the crank axle bearings are 5-16 inch, producing less friction and making a smoother running bearing than the ¼-inch balls commonly used.

The Monarch one-piece crank axle shown in Fig. 2 has been brought out in recognition of the large and growing demand for such a construction. The cups fit into tapered seatings and can be easily removed by hand when desired, yet when the parts are assembled they are held together with absolute firmness. The balls are held in each cup by retainers and run with two points on the cup and one on the cone. The three points are in such position relative to each other that the balls, in place of having a twisted motion, as is common in most bearings, are given a true rolling motion, reducing friction to a minimum. The sprocket spider is secured against a shoulder forged with the crank and is locked by the right cone. Dust caps are screwed into the ends of the hanger barrel, and between them and the ball retaining rings are placed washers made from piano felt. These caps also serve, when in position, to secure the two cups in their seatings. These washers serve as added security against dust getting at the bearings, and at the same time collect and hold for lubrication any surplus oil which may be used.

The seat post bracket shown in Fig. 3 is forged steel,

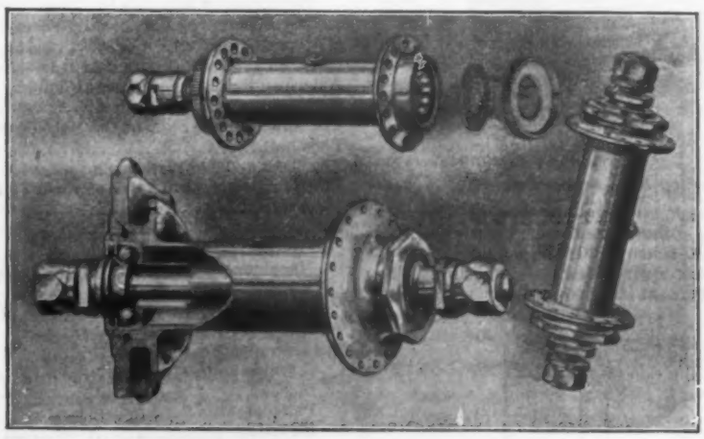


Fig. 3. Monarch and Defiance Hubs.

and all tubes centering at this point have flush joints. The internal clamping device is a novel and very effective one, consisting of a bushing split to permit of elasticity and tapered at both ends. The lower end fits into a corresponding taper in the interior of the bracket and the upper fits a like taper in the clamping collar, which screws into the top for the application of a wrench, this being the only part of the clamp which protrudes above the frame.

The hubs, shown in Fig. 4, are steel drop forgings and

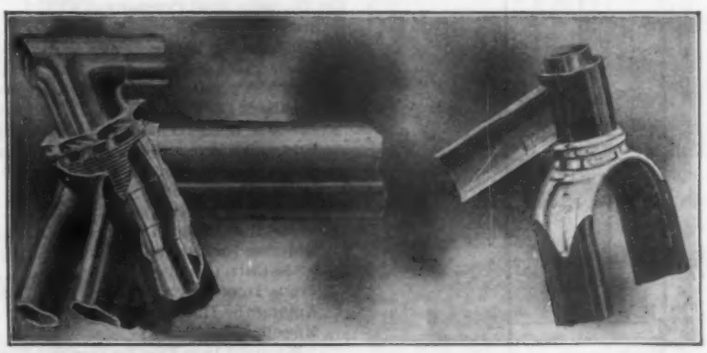


Fig. 4.—Seat Post Bracket and Front Fork Crown.

absolutely dust proof, being fitted with ball retainers, felt washers and metal dust caps. Monarch and Defiance ball bearings embody the best scientific principles and are given special attention with reference to construction and produced from the finest stock obtainable for the purpose. The flanges of the hubs are very carefully drilled to carry the strain of the spokes uniformly.

Magic Trolley Ladder.

Portland Ladder Company, 23 Plane street, Newark, N. J., are manufacturing J. A. Weston's store ladder, shown in the accompanying engravings. It is designed

Fig. 1.—Fast Rolling Store Service Ladder.

for use in stores, libraries, offices, factories, municipal and private buildings, &c. A feature of the construction is the small amount of space required for its operation. The rolling trolley guide wheels at the top allow the ladder

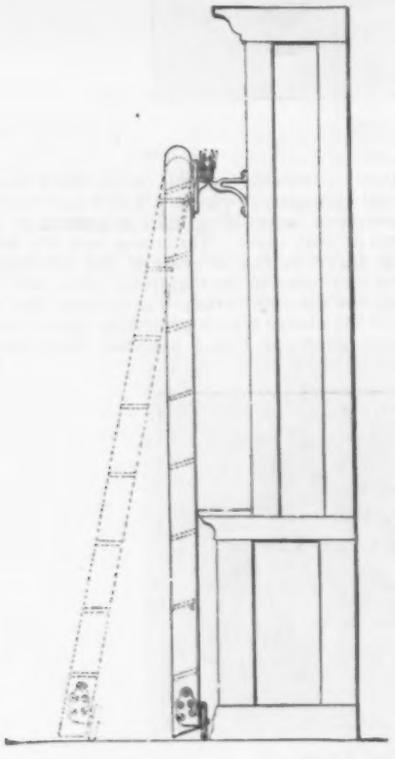


Fig. 2.—Profile View, Showing Possible Angles.

to be used at any desired angle or in any particular position required. The ladders run on noiseless, ball bearing, vulcanized rubber rollers that do not require any track on the floor. The material of the ladders is the best white ash, natural finish. Attention is called particularly to the oscillating slide shown in Fig. 2, by which a choice of angles is always possible, according to the floor space available. Regularly they are made in nine sizes, rising by feet from 8 to 16 feet inclusive, larger ones being made to order.

J. H. Long, Orwigsburg, Pa., has purchased D. R. Kistler's coach making works and will operate it in connection with his retail Hardware, Stove and Sporting Goods business.

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Current Hardware Prices.

REVISED MAY 23, 1899.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, and are in many cases their regular prices to the small trade, lower prices being frequently quoted to the fair retail trade, either by the manufacturers or by the jobbers.

Cut Prices.—*In the present condition of the market, while many advanced prices are announced by the manufacturers, lower prices are often made by the wholesale trade who have stocks on hand purchased at former quotations.*

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 6, 1899), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" is in preparation and will contain the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, ₩ doz. $3.00....33⅓&33⅓&10%
North's....10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—

Ives' Patent....40%
Taplin's Perfection....55%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—

Eagle Anvils....₩ lb 7¼@7¾¢
Hay-Budden, Wrought....8¼@8¾¢
Horseshoe brand, Wrought....9¼@9¾¢
Samson....₩ lb 7¼@8¢
Trenton, Wrought....₩ lb 8¼@8¾¢

Imported—

Armitage's Mouse Hole....8¾@9¼¢
Peter Wright's....9¼@9¾¢

Anvil, Vise and Drill—

Millers Falls Co., $18.00....20%

Apple Parers—See *Parers, Apple, &c.*

Augers and Bits—

Common Double Spur....75&10@80%
Boring Machine Augers..75&10@80%
Car Bits, 12-in. twist....60&10&10@70&10%
Jennings' Pattern:
Auger Bits....70&5@70&10%
Car Bits....60@60&10%
Ford's Auger and Car Bits.. 40&10@40&10&10%
Forstner Pat. Auger Bits....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list.... 40@40&10%
No. 30, R. Jennings' List..50&10@60%
Russell Jennings'....25&10&2½%
L'Hommedieu Car Bits15&10@15&10&5%
Pugh's Black....20%
Pugh's Jennings' Pattern....35%
Snell's Auger Bits....70%
Snell's Bell Hangers' Bits....50%
Snell's Car Bits....60&10&5@70%
Wright's Jennings Bits (R. Jennings' list)....50%

Bit Stock Drills—

Standard List....60&10&10@70%

Expansive Bits—

Clark's small, $18; large, $26.... 50@50&10%
Lavigne's Clark's Pattern, No. 1, ₩ doz., $26; No. 2, $18....50@50&10%
Steer's No. 1, $26; No. 2, $18...40@40&5%
Swan's....40@40&10%

Gimlet Bits—

Common Double Cut..gro. $2.75@3.25
German Pattern....gro. $5.00
Double Cut, makers' lists..50@50&10%

Hollow Augers—

Bonney's Adjustable, ₩ doz....$16.00
Douglass'....33⅓@33⅓&10%
Stearns', Common, No. 6....10%
Stearns', all other numbers....20&10%

Ship Augers and Bits—

Ford's....40&10@40&10&10%
Snell's....40&10&5%
L'Hommedieu's....15&10@15&10&10%
Watrous'....40@40&10%

Awl Hafts, See *Hafts, Awl.*

Awls—

Brad Awls:
Handled....gro. $2.75@3.10
Unhandled, Shouldered..gro.65@70c
Unhandled, Patent....gro. 70@75c
Peg Awls:
Unhandled, Patent....gro. 33@35c
Unhandled, Shouldered..gro.65@70c
Scratch Awls:
Handled, Common..gro. $2.25@3.75
Handled, Socket..gro. $11.00@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

First Quality, best brands..$5.00@5.25
First Quality, other brands$4.25@4.75
Jobbers' Special Brands, good quality....$4.00@4.75
Cheap Handled Axes....4.75@5.25
Beveled, add 25c doz.

Axle Grease—See *Grease, Axle.*

Axles—

	Iron.	*Steel.*	
Concord, loose collar...	*5¼c*	*5 c*	5% cash
Concord, solid collar...	*5¾c*	*5½c*	
No. 1 Common....	*4 c*	*3¾c*	
No. 1¼ Com. New Style..	*4½c*	*4¼c*	
No. 2, Solid Collar....	*4¾c*	*4½c*	
Nos. 7, 8, 11 to 14....		*60&5%*	
Nos. 15 to 18....		*50%*	
Nos. 19 to 22....		*70%*	

Balances—

Sash—

Caldwell low list....30%
Pullman's....65%
Vanderbilt....30%

Spring—

Spring Balances....50@50&5%
Chatillon's Light Spg. Balances....50%
Chatillon Straight Balances....40&10%
Chatillon Circular Balances....50&10%
Chatillon's Large Dial....35%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb....2¾@3¼¢

Beams, Scale—

Scale Beams, List Jan. 12, '83....50@50&5%
Chattillon's No. 1....40%
Chattillon's No. 2....50%

Beaters—Egg—

Dover Pattern, Family Size....gro. $5.50@5.75
Spiral....gro. $3.00@3.25
Dover (Standard Co.), No. 10, ₩ gro. $6.25; No. 5, $5.75; No. 15, $14.00
Dover (Taplin Mfg. Co.) No. 50, ₩ gro. $5.25; no. 100, $6.00; No. 102, $8.00; No. 150, ₩ doz. $1.50; No. 152, $2.00.
Lyon's, Standard ....₩ doz. $1.75
Wonder (S. S. & Co.)....₩ doz. 75¢

Bellows—

Blacksmith—

Standard List....70@70&10%

Net Prices.

Inch..	*30*	*32*	*34*	*36*	*38*	*40*
Each..	*$4.00*	*4.25*	*5 00*	*5.50*	*6.25*	*7.50*
Extra Length:						
Each..	*$4.75*	*5.25*	*5.75*	*6.50*	*7.40*	*8.75*

Molders—

Inch..	*9*	*10*	*11*	*12*	*14*	*16*
Doz...	*$6.25*	*6.75*	*8.00*	*9.00*	*11.50*	*13.75*

Hand—

Inch...	*6*	*7*	*8*	*9*	*10*	*12*
Doz....	*$3.40*	*3.75*	*4.00*	*4.75*	*5.50*	*6.40*

Bells—Cow—

Ordinary goods....75&10%
High grade....70@70&10%
Jersey....75&75&10%
Texas Star....50&10%

Door—

Gong, Yankee....60&10%
House, R. & E. Mfg. Co.'s....50&10%
Lever and Pull, Sargent's....45&10@45&10&5%

Hand—

Hand Bells, Polished....65&10@70%
White Metal....65&10@70%
Nickel Plated....50&5@50&10&5%
Swiss....65@65&10%

Miscellaneous—

Farm Bells....lb. 8¢
Steel Alloy Church and School..50&10%

Belting

Rubber—

Common Standard....75@75&10%
Standard....70&5@70&10%
Extra....60&10@60&10&5%
High Grade....60@60&10%

Leather—

Extra Heavy, Short Lap....50&10%
Regular Short Lap....60@60&5%
Standard....60&10@60&10&5%
Light Standard....70&10%

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—

Bretteil Tire Upsetter, $15....50%
Green River Tire Benders and Upsetters....20%
Stoddard's Lightning Tire Upsetters....40@50%

Bicycle Goods—

Lane's Cycle Hanger....33⅓&5%
John S. Long's Son's 1899 list:
Balls....50%
Chain....50%
Parts....50%
Spokes....50&10%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Bit Holders—See *Holders.*

Blind Adjusters—See *Adjusters, Blind.*

Blind Fasteners—See *Fasteners, Blind.*

Blind Staples—See *Staples, Blind.*

Blocks—Tackle—

Common Wooden...75&10@75&10&5%
Eddy's All Steel, Common Bushed....70%
Eddy's All Steel, Bronze Bushed...60&5%
Harts All Steel, Common Bushed.50&10%
Hartz All Steel, Bronze Bushed..50&10%
Ford's Star Brand, Self Lubricating..70%
Hollow Steel, Ford's Pat. Star Brand.... 50&10%
Lane's Pat. Adj., Perfect Safety and Junior....30%
Stowell's Novelty, Mal. Iron....50&10%
See also *Machines, Hoisting.*

Boards, Stove—

1898 or 1899 List....33⅓@40%

Bolts—

Carriage, Machine, &c.—

Common, list Jan. 30, '95....70@70&10&5%
Norway Iron, $3.00, list Oct. 7, '84..75&10@75&10&5%
Phila. Eagle, $3.00 list....85&15%
Bolt Ends, list Jan. 30, '95....70@70&10&5%
Machine list June 12, '96....70&10@70&10&10%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch....	*3*	*4*	*5*	*6*	*8*
Per doz...	*$0.27*	*.30*	*.38*	*.53*	*.66*

Cast Iron Bottom, Japanned:

Inch....	*6*	*8*	*10*
Per doz....	*$0.83*	*1.05*	*1.65*

Cast Iron Chain, Flat, Japanned:

Inch....	*6*	*8*	*10*
Per doz....	*$1.10*	*1.32*	*1.87*

Cast Iron Shutter, Brass Knobs:

Inch....	*6*	*8*	*10*
Per doz....	*$0.49*	*.77*	*.88*

Wrought Barrel Brass Knob:

Inch....	*3*	*4*	*5*	*6*	*8*
Per doz...	*$0.44*	*.50*	*.61*	*.70*	*1.23*

Ives' Patent Door....65@65&10%
Wrought Flush—
B. K., Sargent's list....50&10@60%
B. K., Stanley's list..60&10@60&10&5%
Sunk, Sargent's or Stanley's list.... 50&10@50&10&5%
Wrought Shutter, Standard list 60&10&7½@70%
Wrought Square, Standard list 75@75&10%

Stove and Plow—

Plow....70@70&10%
Stove, list August 27, 1895..70@70&10%

Tire—

Common, list Feb. 28, '83....70@70&10%
American Screw Company:
Norway Phila., list Oct. 16, '84..75&10%
Eagle Phila., list Oct. 16, '84....80&10%
Bay State, list Feb. 28, '83....70%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..75&10%
Eagle Phila., list Oct. 16, '84....80&10%
Eclipse, list Feb. 28, '83....70%
Port Chester Bolt & Nut Company
Empire, list Feb. 28, '83....70%
Keystone Phila., list Oct. '84....80&10%
Norway Phila., list Oct. '84....75&10%

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$3.75*	*4.75*	*5.75*	*6.75*
Inch....			*2¼*	*2½*
Per Doz....			*$3.00*	*11.00*

Enterprise Mfg. Co....25@30%
No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.

Boring Machines—See *Machines, Boring.*

Braces—

NOTE.—Most Braces are sold at net prices.
Common Ball, American...$1.10@1.20
Barber's....60@60&10%
Fray's Genuine Spofford's....50&10&5%
Fray's No. 70 to 120, 81 to 123, 207 to 414....50&10&5%
P., S. & W. Co., Peck's Patent....60&10&5@60&10&10%

Brackets—

Cast Iron, plain....75@75&10%
Wrought Steel....70&10@75%

Bright Wire Goods—See *Wire.*

Broilers—

Wire Goods Co....75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—

Hoosier....₩ gro. $22.00@$24.00

Bull Rings—See *Rings, Bull.*

Butts—Brass—

Wrought list Sept., '96..40&5@40&10%
Cast Brass, Tiebout's....50%

Cast Iron—

Fast Joint, Broad....60@60&10%
Fast Joint, Narrow....60&10@60&10&10%
Loose Joint
Loose Pin
Mayer's Hinges
Parliament Butts
} *75@75&10%*

Wrought Steel—

Loose Joint
Table and Back Flaps..
Narrow and Broad....
Inside Blind....
Loose Pin....
} *See Trade Report.*
Loose Pin, Ball and Steeple Tip....80&5@80&10&5%
Bronzed Wrought Narrow and Inside Blind Butts....50&10@50&10&5%

Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series....10%
1200 series....40%
300, 300, 600 and 900 series.40&10@50%
Hendryx Bronze:
700, 800 series....40&10@50%
Hendryx Enameled....40&10@50%

Calipers—See *Compasses.*

Calks, Toe—

Burke's, One Prong, Blunt....4@4¼¢
Burke's, One Prong, Sharp....5@5½¢
Burke's, Two Prong, Blunt....5@5½¢
Burke's, Two Prong, Sharp....6@6½¢
Gautier, One Prong, Blunt....5½@6¢

Can Openers—See *Openers, Can*

Cans, Milk—

Buffalo Pattern:

	5	8	10 gal.
Concave Cover....	$1.25	$2.00	$2.20
Convex Cover....	1.40	2.15	2.35
Illinois Pattern....	....	1.80	2.00
Iowa Pattern....	...	1.75	1.95
New York Pattern....	...	2.25	2.45
Baltimore Pattern....	....	2.35	2.55

Cans, Oil—

Galvanized Blue Band, 1-gal., ₩ doz. $1.60@$1.80
S. S. & Co., Galvanized Family with faucet, 3-gal., ₩ gro. $54; 5-gal. $60; 10-gal., $180.00
Glass Oil....₩ doz. $1.60@$1.85

Caps—Percussion—

Eley's E. B....50c
G. D....per M 52@53c
F. L....per M 37@40c
G. E....per M 47@50c
Musket....per M 57@60c

Primers—

Berdan Primers, $1.00 ..... 2%
B L Caps (Sturtevant Shells) $1.00 ..... 2%
All other primers ..... *$1.00@$1.10*

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

B. B. Caps, Con., Ball Swgd. ... *$1.90*
B. B Caps, Round Ball ... *$1.12@1.18*
Blank Cartridges:
32 C. F., $5 50 ..... 2%
38 C. F., $7 00 ..... 2%
22 cal. Rim, $1.50 ..... 2%
32 cal. Rim. $2.75 ..... 2%
Central Fire ..... 15&5&2%
Pistol and Rifle ..... 25&5&2%
Primed Shells and Bullets ... 15&5&2%
Rim Fire Sporting ..... 60&2%
Rim Fire, Military ..... 15&5&2%

Carpet Sweepers—

See *Sweepers, Carpet.*

Casters—

Bed Plate, etc ..... 50@70&5%
Martin's Patent (Phœnix) .... 60@60&5%
Payson's Anti-friction Furniture ..... 70&10&5%
Payson's Anti-Friction Truck. 60&10&5%
Standard Ball Bearing 50%
Tucker's Patent, low list ..... 50@50&5%

Cattle Leaders—

See *Leaders, Cattle.*

Chain—

American Coil, Cash Lots:

5-16	¼	5-16	⅜	7-16	½	9-16
$7.10	6.35	4.35	3.70	3.55	3.40	3.35
⅝	¾	⅞	1 inch.			
$3.25	3.20	3.10	3.10			

Less than Cask lots add 1-10c. per lb.
German Coil, list July 24, '97 ..... 60&10&10@70%
German Halter Chain, list July 24, '97 ..... 60&10&10&5@70%
Trace, Wagon and Fancy Chains, list April, '98 ..... 60&10&10@70%
Jack Chain, list July 10, '93:
Iron ..... 70&10%
Brass ..... 50&10&5@60%
Gal. Pump Chain ..... *lb. 4½@4¾c*
Breast, Hitching and Rein Chains
Covert Sad. Works 70%
Covert Mfg. Co.:
Breast ..... 45&2%
Halter ..... 45&2%
Heel ..... 45&2%
Rein ..... 45&2%
Stallion ..... 45&2%
Oneida Community:
Niagara and Eureka Weldless Co l and Halters ..... 65&5@70%
Niagara and Eureka Weldless Cow Ties ..... 60&5@65%
American Coil and Halters. 60&5@45%
American Cow Ties ..... 50&5@55&5%

Chalk—(From Jobbers.)

Carpenters', Blue ..... *gro. 50@52c*
Carpenters', Red ..... *gro. 45@47c*
Carpenters', White ..... *gro. 40@42c*
See also Crayons.

Chalk Lines—See *Lines.*

Checks, Door—

Bardsley's 40%
Columbia ..... 50&10%
Eclipse ..... 60@60&10%

Chisels—

Socket Framing and Firmer

Standard List ..... 75&10@80%
Buck Bros 30%
Charles Buck 30%
Sa an's ..... 75@75&5&2½%
L. & I. J. White ..... 30@30&5%

Tanged and Miscellaneous.

Tanged Firmers ..... 40&10@50%
Cold Chisels, good quality lb. 14@16c
Cold Chisels, fair quality ..... *lb. 12c*
Cold Chisels, ordinary ..... *lb. 7@7½c*
Buck Bros 30%
Charles Buck 30%
L. & I. J. White, Tanged ..... 20&5%

Chucks—

Beach Pat., each $8.00 ..... 20%
Morse's Adjustable, each $7.00. ..... 25%
Skinner Patent Chucks:
Combination Lathe Chucks 40%
Drill Chucks 30%
Independent Lathe Chucks 40%
Improved Planer Chucks 20%
Universal Lathe Chucks 40%
Union Mfg. Co.:
Combination 40%
Czar Drill 30%
Geared Scroll 33⅓%
Independent 40%
Union Drill 30%
Universal 40%
Face Plate Jaws 35%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Adjustable, Stearns' ..... 30@30&10%
Cabinet, Sargent ..... 45&10@50&10%
Carriage Makers', P., S. & W. Co.. 40&10%
Carriage Makers', Sargent's ..... 50&10@50&10&5%
Beaver, Parallel 33⅓%
R. I. Tool Co.'s Wrought Iron 25%
Saw Clamps, see *Vises, Saw Filers'.*
Stearns Malleable, with Wrought Iron Screw ..... 75@75&5%
Stearns Steel ..... 25&10%
U S Lock Co ..... 40&10@40&10&5%

Cleaners, Walk—

Star Socket, All Steel .... ₱ doz. $4.00 net
Star Shank, All Steel .... ₱ doz. $3.75 net

Cleavers, Butchers'—

Foster Bros. Flat Hds., 30%; Rd. Hds., 40%
New Haven Edge Tool Co.'s 40%
Nichols Bros., Flat hdl., 30%; Rd. hdl., 40%
Fayette R. Plumb ..... 33⅓&7½%
P., S. & W ..... 33⅓&5@33⅓&10%
L. & I. J. White 25%

Clippers—

Chicago Flexible Shaft Company:
Handy Toilet ..... ₱ doz. $7.20
Mascotte Toilet ..... ₱ doz. $8.40
Monitor Toilet ..... ₱ doz. $9.00
Stewart's Patent ..... ₱ doz. $10.00

Clips, Axle—

Eagle and Superior ¼ and 5-16 inch ..... 75&10@75&10&5%
Norway, ¼ and 5-16 inch. .75@75&5%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list (Globe, Kerosene, Lever Bibbs, Racking, &c.). ..... 70@70&5%

Coffee Mills—See *Mills, Coffee.*

Collars, Dog—

Brass, Pope & Stevens' list 40%
Embossed, Gilt, Pope & Stevens' list 30&10%
Leather, Pope & Stevens' list 40%

Compasses, Dividers, &c.

Ordinary Goods ..... 70&10@75%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Call's Patent Inside 55%
Calipers, Double 70%
Calipers, Inside or Outside 70%
Calipers, Wing 60%
Compasses ..... 50&5%
J. Stevens A. & T. Co ..... 25&10%

Coolers, Water—

S. S. & Co.: 2-gal., $2.70; 3-gal., $3.20; 4-gal., $3.60; 5-gal., $4.75; 8-gal., $7.20; 11-gal., $11; 14-gal., $14 each 60%

Coopers' Tools—

See *Tools, Coopers'.*

Cord— Sash—

Braided, Drab and Fancy ..... *lb. 25c* ... 60@50&10%
Braided, White, lb ..... *14@18%*
Cable Laid Italian..lb. A, 18c; B, 16c
Common India ..... *lb. 8½@9c*
Cotton Sash Cord, Twisted ... *12@14c*
Patent Russia ..... *lb. 12½@13c*
Cable Laid Russia ..... *lb. 13½@14c*
India Hemp, Braided ..... *lb. 11@12c*
India Hemp ..... *lb. 9@10c*
Patent India ..... *lb. 10½c*
Pearl Braided, cotton ..... ₱ lb 16¢
Massachusetts, White ..... ₱ lb 17¢
Eddystone Braided Cotton ..... ₱ lb 18¢
Harmony Cable Laid Italian ..... ₱ lb 18¢
Osgawan Mills:
Crown, Solid Braided White ... ₱ lb 18¢
Braided, Giant, White ..... ₱ lb 16¢
Peerless:
Cable Laid Italian ..... 16¢
Cable Laid Russian ..... 13¢
Cable Laid India ..... 11¢
Braided India ..... 18¢
Samson:
Braided, Drab Cotton ..... ₱ lb 33@35¢
Braided, Italian Hemp ..... ₱ lb 31@33¢
Braided, Linen ..... ₱ lb 53@56¢
Braided, White Cotton ..... ₱ lb 27@30¢
Silver Lake:
A quality, Drab, 40¢ ..... 15&7½%
A quality, White, 35¢ ..... 15&7½%
B quality, Drab, 35¢ ..... 15&7½%
B quality, White, 30¢ ..... 15&7½%
Italian Hemp, 40¢ ..... 15&7½%
Linen, 57½¢ ..... 15&7½%

Wire, Picture—

Braided or Twisted ..... *85@85&5%*

Corn Knives and Cutters

—See *Knives, Corn.*

Crackers, Nut—

Acme, Japanned, ₱ gr. $30 ..... 40%
Acme, Nickel Plated, ₱ gr. $30 ..... 20%
Turner & Seymour Mfg. Co 50%

Cradles—

Grain *55%*

Crayons—

White Round Crayons, gross ... *5@6c*
Cases, 100 gro., $4.50@$5 00, at factory.
D. M. Steward Mfg. Co.:
Metal Workers', ₱ gr. $2.50 .... 20@25%
Railroad, ₱ gr. $2.00 ..... 20@25%
Rolling Mill, ₱ gr. $2.50 ..... 20@25%
Soapstone Pencils, ₱ gr. $1.50. 20@25%
See also *Chalk.*

Creamery Pails—See *Pails, Creamery.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden ..... ₱ doz. $10.00

Curry Combs—

See *Combs, Curry.*

Cutters— Meat—

American 30%

Nos.	1	2	3	4	5	6
Each	$5	$7	$10	$25	$50	$60

Enterprise ..... 25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.50	$4	$6

Dixon's, ₱ doz 33⅓%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Hale's, ₱ doz ..... 70@70&5%

Nos.	11	12	13
	$27.00	$33.00	$45.00

Home No. 1, ₱ doz. $26.00 ..... 60%
Little Giant, ₱ doz ..... 50&10%

Nos.	805	310	312	320	322
	$35 00	$48.00	$44.00	$72.00	$68.00

Miles' Challenge, ₱ doz ..... 45@45&10%

Nos.	1	2	3
	$22.00	$30.00	$40.00

New Triumph No. 605, ₱ doz. $24.00 ..... 33⅓&5%

Woodruff's, ₱ doz	33⅓%	
Nos.	100	150
	$15.00	$18.00

Chadborn's Smoked Beef Cutter, ₱ doz. $60.00
Enterprise Beef Shavers ..... 25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Cabbage Grater, &c. 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9. 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters ..... 50@50&10%
Slaw Cutters, 1 Knife, ₱ gr. ... $15@$18
Slaw Cutters, 2 Knife, ₱ gr. ... $20@$27

Tobacco—

All Iron, Cheap ..... *doz. $4.50@$5 00*
Enterprise ..... 25@30%
National, ₱ doz. $21.00 ..... 30&5%
Sargent's, ₱ doz. $24.00 ..... 60@60&10%

Washer—

Appleton's, ₱ doz. $16.00 ..... 60&10@60&10&10%
Bonney's ..... ₱ doz. $4.25

Diggers, Post Hole, &c.—

Iwan's Improved Post Hole Auger. 40&5%
Iwan's Perfection Post Hole Digger. ₱ doz. $10.00
Samson, ₱ doz. $34.00 ..... 25%

Dividers—See *Compasses.*

Dog Collars—See *Collars, Dog.*

Door Checks—

See *Checks, Door.*

Door Springs—

See *Springs, Door.*

Drawers, Money—

Tucker' Pat. Alarm Till No. 1, ₱ doz. $18; No. 2, $12; No. 3, $11; No. 4, $12.

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50
Blacksmiths' Self-feeding ..... *each $5.00@6.00*
Bench Drills, Stearns' ..... 50@50&10%
Breast, Millers Falls, each $3.00 ..... 25%
Breast, P., S. & W ..... 40&10%
Goodell Automatic Drills. 40&5@40&10%
Ratchet, Bignall & Keeler ..... 30&5%
Ratchet, Curtis & Curtis 25%
Ratchet, Ingersoll's 25%
Ratchet, Parker's 40%
Ratchet, Weston's ..... 20@25%
Ratchet, Whitney's ..... 20&10%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Standard List ..... *60&10&10@70%*

Drill Bits or Bit Stock Drills—See *Augers and Bits.*

Drill Chucks—See *Chucks.*

Dripping Pans—

See *Pans, Dripping.*

Drivers, Screw—

Balsey's Screw Holder and Driver, ₱ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9.. 40%
Buck Bros 30%
Buck Bros' Screw Driver Bits 27½%
Champion ..... 40&10%
Douglass's Flat Blade, Elec ric, &c. 40%
Douglass Mfg. Co ..... 20@20&10%
Electric Spiral ..... 50&10&10&5%
Ellrich's Socket ..... 40&10%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay & Parsons' Ratchet 35%
Goodell's Automatic ..... 50&10&10@50&10&10&5%
Howard-Allard Spiral ..... 50&10&10&5%
Jones Reversible 50%
Mayhew's Black Handle 50%
Mayhew's Monarch ..... 45&10%
New England Specialty Co ..... 50&10%
New York, Manhattan and Handy ... 20%
Sargent & Co.'s:
Nos. 1, 20, 40 and 60. 50&10@50&10&5%
Nos. 50 and 55 ..... 50&10&10@60&5%
Screw Driver Bits ..... ₱ doz. 50@70¢
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles ..... 70&10%
No. 86 ..... 75&10%

Egg Beaters—See *Beaters, Egg.*

Emery—*Nos. 4 to 5½ to Flour, CF:*

	46 gro.	180 gro.	F.FF.
Kegs	*lb. 4½c*	*5 c*	*5 c*
⅛ Kegs	*lb. 4¾c*	*5¼c*	*5¼c*
¼ Kegs	*lb. 5 c*	*5½c*	*5½c*
10-lb cans, 10 in case	*6 c*	*6½c*	*5½c*
10-lb. cans, less than 10	*10 c*	*10 c*	*8c*

Enameled and Tinned Ware—See *Ware, Hollow.*

Escutcheon Pins—

See *Pins, Escutcheon.*

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%

Faucets—

Cork Lined ..... 70&5@70&10&5%
Metallic Key, Leather Lined ..... 65&10@70%
Red Cedar ..... 50@50&10%
B. & L. B. Co.:
West's Lock, Open and Shut Key 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's No Brand Metal Key. 60%
John Sommer's W. P. Metal Key 40%
John Sommer's Diamond Lock 40%
John Sommer's L. K. L. Cork Lined. 50%
John Sommer's Reliable Cork Lined. 60%
John Sommer's Common Cork Lined. 70%
John Sommer's Chicago Cork Lined. 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's Perfection Cedar 40%
Star ..... 60@60&5%
Star, Metal Plug, new list ..... 40@40&5%
Stearns' Wood, No. 200, Wood-lined Key ..... 50&10%
Stearns' Matchless, Wood, No. 300 ... 60%
Stearns' Gem, Wood, No. 400 ..... 60&10%
Lockport, Metal Plug, reduced list. 60&5%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40%
Lane's, ₱ doz. $36.00 ..... 33⅓%
National Measuring, ₱ doz. $36.00. 33⅓%

Felloe Plates—

See *Plates, Felloe.*

Files—Domestic—

Best Brands ..... 70@70&10&10%
Good Brands ..... 75&10@80&5%
Fair Brands ..... 80&5@80&10%
Second Quality ..... 80&10@85%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 30@33⅓%

Fixtures, Grindstone—

Net Prices:

Inch....	15	17	19	21	24
Per doz.	*$2.50*	*2.60*	*2.95*	*3.25*	*4.50*

Stowell's Grant Grindstone Hanger. ₱ doz. $6.00@$7.00
Stowell's Grindstone Fixtures.... 55&10%
P., S. & W. Co ..... 50&10&10%
Reading Hardware Co ..... 30&20&10%
Sargent's Patent ..... 70&10@70&10&10%

Fluting Machines—

See *Machines, Fluting.*

Fodder Squeezers—

See *Squeezers, Fodder.*

Forks—

Old, or 1895 list.
Hay, Manure, &c. 60&10@60&10&5%
1898, or High list.
Hay, 2 tine ..... 70&2%
Hay, 3 tine ..... 70&2%
Manure, 4 tine ..... 65%&20&2%
Manure, 5 and 6 tine ..... 70&10&2%
Spading ..... 70&15&2%
Victor, Hay ..... 60&33⅓&2½&2%
Victor, Manure ..... 75&5&2%
Victor, Header ..... 70&12½&2%
Champion, Hay ..... 70&10&2%
Champion, Manure ..... 75&2%
Columbia, Hay ..... 70&7½&2%
Columbia, Manure ..... 75&5&2%
Columbia, Spading ..... 60%&25&2%
Hawkeye Wood Barley 4 tine ₱ doz $5.00; 6 tine, $5.50.
Plated.—See *Spoons.*

1899 or high list

Frames—

Saw—

Red, Polished and Varnished..doz. $1.00@$1 10
White ..... *gro. $3.25@$3.50*

Screens, Window and Door—

Bonanza Window Screens ..... 60@60&5%
Phillips' Window Screen Frames. .60&5%
Porter's Extension Window Screens. 60&5%
Stearns' Frames and Corners 25@25&10%
Stearns' Monarch Adjustable Window Screens 50%
Stearns' Gem Window Screen Frames. 25&10%
Wabash Adj. Window Screen 50%
Warner's Screen Corner Irons. .33⅓&10%

Freezers, Ice Cream—

Qts...	*2*	*3*	*4*	*6*	*8*	*10*
Best.	*$1.40*	*1 60*	*1.85*	*2.50*	*3.00*	*3.90*
Good	*$1 25*	*1.35*	*1.70*	*2.05*	*2 65*	*3.50*
Fair.	*$1.00*	*1.10*	*1 30*	*1.75*	*2.30*	*2.90*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—

	Per 1000 Feet.
Hemp Fuse	*$2.60*
Cotton Fuse	*3.90*
Single Taped Fuse	*3.50*
Double Taped Fuse	*4.70*
Triple Taped Fuse	*5.70*

50%

Gates, Molasses and Oil—

Stebbin's ..... 80&20@85%
Stearns' Molasses and Oil ..... 30&10%

Gauges—

Barrett's Comb. Roller Gauge. ₱ doz. $6.75@7.35
Marking, Mortise, &c. ..... 60&10@60&10&10%
Stanley R. & L. Co.'s Butt & Rabbet Gauge ..... 25&10%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire, P., S. & W. Co ..... 10&10%
Wire, Wheeler, Madden & Co 10%

Gimlets—
Nail, Metal, Assorted ..gro. $3.00@3.50
Spike, Metal, Assorted gro. $3.75@4.00
Nail, Wood Handled, Assorted, gro. $4.50
Spike, Wood Handled, Assorted gro. $4.00

Glass, American Window
List Jan. 1, 1898.

Small lots from store:
Eastern ..80&20%
Western ..80&20@85&5%
From Factory, with Frt. Allowance:
Carloads ..80&20%
1000 boxes or more, Gulf Ports ..85&10%
5000 boxes or more ..85@85&2½%
5000 boxes or more ..85&5%

Glue—Liquid, Fish—
List A, Bottles or Cans, with Brush ..37½&50%
List B, Cans (½ pts., pts., qts.) ..33½&43%
List C, Cans (½ gal., gal.) ..25&45%

Glue Pots—See *Pots, Glue.*

Grease, Axle—
Allerton's Axle:
1 lb Tins, ₩ gr ..$9.00
3 lb Tin Pails, ₩ doz., $2.00; 5 lb, $3.00; 10 lb, $6.00.
25 lb wood pails ..₩ doz. $12.00
Dixon's Everlasting ..10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs., ₩ doz. 1 lb $1.20; 2 lb $2.00
Lower grades, special brands, ₩ gr. $5.00@6.50

Grindstone Fixtures—
See *Fixtures, Grindstone.*

Gun Powder—See *Powder.*

Hack Saws—See *Saws.*

Hafts, Awl—
Peg Patent, Leather Top ..gro. $4.90
Peg Patent, Plain Top ..gro. $3.45
Sewing, Brass Ferrule ..gro $1.50
Saddlers', Brass Ferrule ..gro. $1.35
Peg, Common ..gro. $1.25
Brad, Common ..gro. $1.35

Halters and Ties—
Covert Mfg. Co., Web and Rope ..45&2%
Covert's Saddlery Works', 96 list ..70%

Hammers—
Handled Hammers—
Heller's Machinists' ..40@40&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..40&10%
Pecx, Stow & Wilcox ..40@40&5%
Fayette R. Plumb:
Artisans' Choice, A. E. Nail ..40&12½%
Engineers' and B. S. Hand ..60%
Machinists' Hammers ..60%
A. E. & A. E., Bell Face Nail ..40&12½%
Other Nail Hammers ..50%
Sargent's C. S. New List ..45&50%

Heavy Hammers and Sledges—
2 lb. and under ..lb. 45c
3 to 5 lb ..lb. 36c
Over 5 lb ..lb. 30c
} 75&10&5@80&5%
Wilkinson's Smiths' ..9½c@10c lb.

Handcuffs and Leg Irons
See *Police Goods.*

Handles—
Agricultural Tool Handles—
Hoe, Rake, Fork, &c. ..60&10@60&10&5%
Shovel, &c., Wood D Handle ..60&10%

Cross-Cut Saw Handles—
Atkins' ..40%
Champion ..45@45&10%
Disston's ..50%
Ely's Perfection ..₩ doz. $3.00

Mechanics' Tool Handles—
Auger, assorted ..gro. $2.25@$2.50
Auger, large ..gro. $2.75@$3.00
Brad Awl ..gro. $1.40@$1.50
Chisel Handles:
Apple Firmer, gro ass'd. $2.25@$2.50; *large,* $2.75@$3.00.
Hickory Firmer, gro. ass'd. $2.25@$2.50; *large,* $2.50@$2.75.
Socket, gro. ass'd, Firmer, $1.50@$1.60; *Framing,* $2.50@$2.75.
File, assorted ..gro. $1.00@$1.25
Hammer, Hatchet, Axe, &c. ..50&10%
Hoe, Rake and Fork ..60&10@60&10&5%
Shovel and Spade, Wood D H'dle ..60&1%
Hand Saw, Varnished, doz. 75@80c
Not Varnished ..55@60c
Plane Handles:
Jack, doz. 23@25c; *Jack Bolted* ..55@60c
Fore, doz. 35@38c; *Fore, Bolted* ..70@75c

Hangers—
Barn Door, New Pattern, Round Groove, Regular:

Inch	3	4	5	6	8
Doz	$1.33	1.63	2.16	2.64	5.20

Barn Door, New England Pattern, Check Back, Round Groove, Regular:

Inch	3	4	5	6
Doz	$2.86	3.74	4.24	6.16

Bigelow & Dowse Co.:
Paragon, No. 1, $3.50; No. 2, $4.50; No. 3, $5.50 ₩ doz.
Chicago Spring Butt Co.:
Friction ..35@35&10%
Oscillating ..35@35&10%
Big Twin ..35@35&10%
Chisholm & Moore Mfg. Co.:
Advance ..60&10%
Cleveland ..60&10%
Baggage Car Door ..50%
Elevator ..40%
Railroad ..55%
Lane Bros.:
Parlor, Standard ..40&10%
Barn Door, Standard ..60&10%
Covered ..60&10%
Cycle, ₩ doz. $12.00 ..33⅓&5%
No. 50 ..60&5%
Parlor Door, New Model ..40&5%
Lawrence Bros.:
Crown ..60&10%
New York ..60&10@60&10&5%
Sterling ..60&10%
McKinney Mfg. Co.:
No. 2, Standard, $18 ..60&10%
No. 1, Special, $13 ..60&10%
E. C. Stearns & Co.:
Davis Parlor Door ..50@50&5%
Gem Parlor Sliding Door ..50&10%
Challenge ..50@50&5%
Steel Single Track Parlor, $6 ..50%
Royal Parlor Door ..50%
Warner's Pat ..20&10&10%
Warner's Imp'd Single ..40&10%
Stowell Mfg. and Foundry Co.:
Badger ..60&10%
Baggage Car Door ..33⅓%
Climax Anti-Friction ..55&5%
Elevator ..40%
Interstate ..60&10%
Magic ..50&10%
Matchless ..60&10%
Nansen ..60&10%
Parlor Door ..50&10%
Railroad ..55&5%
Street Car Door ..50&10%
Steel, Nos. 300, 400, 500 ..45&15%
Wild West ..50&5%
Zenith for Wood Track ..55&5%
Taylor & Boggis Foundry Co.:
Kidder's ..50@50&10%
Van Wagoner & Williams Hdw Co.:
American Trackless ..33⅓&10%
Wilcox Mfg. Co.:
Aurora Steel Endless ..60%
Bike Roller Bearing ..60&10&10%
Bike Steel Endless ..60&10&10%
C. J. Roller Bearing ..60&10&10%
Cycle Ball Bearing ..50&10%
Dye Steel ..60&10%
Economical Single Track ..50&10&5%
L. T. Roller Bearing ..70%
New Era ..50&10%
New Richards ..60%
O. K. Roller Bearing ..70%
Prindle Improved ..60&10%
Richards' Improved ..60&10%
Richards' Single Track ..50&10%
Wilcox Dwarf Roller Bearing ..40&10%
Wilcox-Ives ..60&10%
Wilcox Tandem Roller Bearing ..60&10%
Wilcox Trolley Ball Bearing ..40&10%
Wilcox Trolley Roller Bearing ..50%
Wilcox Trolley Roller Bearing, Fire ..40&10%
Wood Track ..60%

Extra 5@10% often given.

Harness Menders—See *Menders.*

Harness Snaps—See *Snaps.*

Hasps—
McKinney's Perfect Hasp, ₩ doz. $1.10 ..40&10%
Wrought Hasps, Staples, &c.—See *Wrought Goods.*

Hatchets—
Best Brands ..40¢12½&50¢5%
Cheaper Brands ..60¢10@60%

Hay and Straw Knives—
See *Knives.*

Hinges—
Blind Hinges—
Lull & Porter:

No.	1	1½	2	2½
Doz. pair	$0.47	.53	.40	.35

1868 Old Pattern:

No.	1	3	5
Doz. pair	$0.55	1.00	2.00

Parker ..75&10@75&10&5%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..10%
Reading's Gravity ..75&10%
Sargent's, Nos. 1, 3, 5, 11, 13 ..75@75&10%
Wrightsville H'dware Co.:
Acme, Lull & Porter ..80&10%
Buffalo Gravity Locking, Nos. 1, 3 and 5 ..80&10&5%
Champion Gravity Locking, No. 75 ..80&10&10%
1868, Old Pat'n, Nos. 1, 3 & 5 ..80&10%
Tip Pattern, Nos. 1, 3 and 5 ..80&10&5%
Double Locking, Nos. 20 and 25 ..75%
Empire, Nos. 101 and 103 ..80%
Niagara Gravity Locking, Nos. 1, 3 and 5 ..80&10%
Noiseless, Nos. 50, 60, 65 and 55 ..80%
O. S. Lull & Porter ..80&10&5%
Pioneer, Nos. 060, 45 and 5½ ..75&5%
Steamboat Gravity Locking, No. 10 ..80&10&5%
Stanley's Steel Gravity Blind Hinges, ₩ doz. sets $1.30 ..40&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with Latches	$1.40	1.75	3.25
Hinges only	0.92	1.40	2.40
Latches only	0.46	.46	.80

New England:
With Latch ..doz. $1.45@1.50
Without Latch ..doz. $1.30@1.35
Reversible Self-Closing:
With Latch ..doz. $1.70@1.75
Without Latch ..doz. $1.30@1.35
Western:
With Latch ..doz. $1.75@1.80
Without Latch ..$0.75@$0.78

Spring Hinges—
Holdback, Cast Iron, gro. $15.00 ..50@50&5%
Non-Holdback, Cast Iron, gro ..₩ $5.50@$5.75
J. Bardsley:
Bardsley's Patent Checking ..15%
Bommer Bros.:
Bommer's ..40%
Chicago Spring Butt Co.:
Chicago ..30%
Garden City Engine House ..30%
Keene's Saloon Door ..30%
Lawson Mfg. Co.:
Matchless ..25%
Matchless Pivot ..40%
Payson Mfg. Co.:
Oblique, Dbl. Acting ..50@50&5%
E. C. Stearns & Co.:
Nos. 45 and 51 ..70%
Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₩ gr. $12.50
Ideal, No. 4 ..₩ gr. $9.00
New Idea No. 1 ..₩ gr. $9.00
New Idea, Double Acting ..45%
Van Wagoner & Williams Hdw. Co.:
Acme ..30&5%
American ..80%
Columbia, No. 14 ..₩ gr. $8.00
Columbia, No. 18 ..₩ gr. $24.00
Crown ..30%
Gem ..30%
Knoxall ..₩ gr. $9.00
Oxford ..30%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list Mar. 15, 1898:
Light Strap Hinges ..75, 10&5%
Heavy Strap Hinges ..80&10%
Light T Hinges ..70%
Heavy T Hinges ..75&5%
Extra Heavy T Hinges ..80%
Rolled Plate ..70¢10@70¢10¢5%
Screw Hook and Strap. 6 to 12 in. lb 3 @3½c; 14 to 20 in. lb. 2¾@3 c; 22 to 36 in. lb. 2½@2¾c
} See Trade Report.

Hoes—
Eye—
Scovil and Oval Pattern ..60@60¢10%
Grub, list Feb. 23, 1899 ..70¢10@70%
D. & H. Scovil ..35@35&5%

Handled—
1895 or Old List:
Cotton, Field, Planters', &c. ..60¢10@60¢10&5%
1898 or High List:
Field and Garden ..60¢10&5¢2%
Ladies', Boys', Toy and Onion ..75¢12½¢2%
Street and Mortar ..75¢15¢2%
Cotton ..75¢10¢2½¢2%
Planters' ..75¢16⅔¢2%
Weeding ..75¢10&5¢2%

Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.
Ft. Madison Crucible Garden Hoe ..75&10&2%
Ft. Madison Crescent Cultivator Hoe, per doz. ..$3.75
Ft. Madison Mattock Hoe, ₩ doz. ..$4.00
Ft. Madison Sprouting Hoe, ₩ doz. ..$4.50
Ft. Madison Dixie Tobacco Hoe ..75&10&2%
Kretsinger's Cut Easy, per doz. ..$4.50
Warren Hoe ..60&10%

Hog Rings and Ringers—
See *Rings and Ringers.*

Hoisting Apparatus—
See *Machines, Hoisting.*

Hollow Ware—
See *Ware, Hollow.*

Holders—Bag—
Sensible Bag and Twine ..50%

Bit—
Angular, ₩ doz. $24.00 ..45&10%

File and Tool—
Nicholson File Holders and File Handles ..33⅓%

Hooks—
Cast Iron—
Bird Cage, Reading ..60%@70%
Bird Cage, Sargent's List ..60%@70%
Clothes Line, Sargent's List ..50@50&5%
Ceiling, Sargent's List ..50@50&5%
Clothes Line, Stowell's ..70&5%
Clothes Line, Reading List 65&10@65&10&10%
Coat and Hat, Stowell's ..70&5%
Coat and Hat, Reading ..70@75%
Coat and Hat, Sargent's List ..50&10%
Coat and Hat, Wrightsville list ..70&10%
Harness, Reading List ..70&10@75%

Wire—
Belt ..80&10@80&20%
Atlas, Coat and Hat ..50@50&10%
Wire Coat and Hat:
Acme ..60@60&5%
B. B ..70@70&5%
Gem ..60%
Bright Wire Goods—See *Wire.*

Wrought Iron—
Box, or Case, Octagon Steel ..doz. $2.00@2.15
Cotton ..doz. $1.00@1.10
Picture, T. & S. Mfg. Co ..75%
Tassel, T. & S. Mfg. Co ..50&10%
Wrought Staples, Hooks, &c.—See *Wrought Goods.*

Miscellaneous—
Bush, Light, doz. $5.00; *Medium,* $5.50; *Heavy,* $6.00

Grass Nos.	1	2	3	4
Best	$1.60	1.75	2.00	
Common	$1.50	1.50	1.50	1.75

Potato and Manure ..75¢15%
Whiffletree ..lb. 4½c
Hooks and Eyes:
Brass ..70¢10@75%
Malleable Iron ..75¢10%
Covert Saddlery Works' Self Looking Gate and Door Hook, 4 in. ₩ gross $13.00; 6 in. $17.20 ..70%
Crown Pictures ..60%
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse.*

Horseshoes—
See *Shoes, Horse.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition ..ft. 4 @ 5 c
3-ply Standard ..ft. 5½@ 6 c
4-ply Standard ..ft. @ 6½c
3-ply extra ..ft. 6½@ 7½c
4-ply extra ..ft. 7½@ 8½c
High Grade ..ft. 9 @11 c
Cotton Garden, ¾-in., coupled:
Low Grade ..ft. 5½c
Fair quality ..ft. 7 c
Good quality ..ft. 8 @ 8¾c

Irons—
Sad—

From 4 to 10 lb.	2.25@2.50c
B. B. Sad Irons	3½c
Chinese Laundry	4½@4½c
Chinese Sad	3½c

Mrs. Potts', per set:

Nos. 50	55	60	65
65@66c	69@69c	73@76c	69@79c

New England Pressing ..lb. 3c

Soldering—
Soldering Coppers ..lb. 21@25c
Covert Mfg. Co ..35&2%

Pinking—
Pinking Irons ..doz. 55@60c

Jack Screws—See *Screws.*

Jacks, Wagon—
Covert Mfg. Co., Steel ..45&2%
Daisy, ₩ doz. $12.00 ..70%
Lockport ..40@40&10%
Victor, ₩ doz. $30.00 ..70%
Lane's Steel ..30%

Kettles—
Brass, Spun, Plain, list Jan. 10, '99 ..15@20%
Enameled and Tea—See *Ware, Hollow.*

Knife Sharpeners—
See *Sharpeners, Knife.*

Knives—
Butcher, Shoe, &c.—
Dick's Butcher Knives ..40%
Foster Bros.' Butcher, &c ..40%
Nichols' Butcher Knives ..50%
Table and Pocket Cutlery and John Wilson's Butcher Knives—Net prices.
Hay and Straw—See *Hay Knives.*

Corn—
Ft. Madison Cut-Easy, ₩ doz ..$3.25

Drawing—
Standard List ..75&10@80%
Adjustable Handle ..25@33⅓%
Bradley's ..35%
Swan's ..75@75&5&2½%
Watrous ..30&10@40%
L. & J. White ..20&5@25%
Cautelo's Folding ..50@50&5%

Hay and Straw—
Blizzard ..$5.50@6.00
Iwan's Sickle Edge ..₩ doz. $10.50
Lightning, from Jobbers ..$5.00@6.00

Mincing—
Buffalo Adjustable, ₩ doz. $3.00 ..40%
Smith's, ₩ doz., Single, $2; Double, $3 ..45&50%

Miscellaneous—
Farriers' ..doz. $2.00@3.00
Wostenholme's ..₩ doz. $3.00@3.25

Knobs—
Base, 2¼-inch, Birch, Rubber tip, gro ..$1.25@1.30
Carriage, Jap, all sizes ..gro. 17@20c
Door, Mineral ..doz. 60@63c
Door, Por. Jap'd ..doz. 65@67c
Door, Por. Nickel ..doz. $1.70@1.80
Bardsley's Wood Door, Shutter, &c ..15%
Picture, Sargent's ..70&10%
Snow's Victor ..50&10%
Yale & Towne Wood, list Dec., '85 ..40%

Ladies—Melting—
P., S. & W ..35&10@4[illegible]
Reading ..50&1[illegible]
Sargent's ..60@60&10%

Lanterns—Tubular—

	Doz.	
Regular Tubular	$7.00	40&5@
Side Lift Tubular	$7.50	40&10@5%
Square Lift Tubular	$7.50	

Bull's Eye Police—
2¼-inch flash light ..doz. $4.00
3-inch flash light ..doz. $4.50
2¾-inch regular ..doz. $3.60
3-inch regular ..doz. $3.90

Latches, Thumb—
Roggin's Latches ..doz. 23c@50c

Lawn Mowers—
See *Mowers, Lawn.*

Leaders, Cattle—
Small ..doz. 45c; *large,* 50c
Covert Mfg. Co ..45&2%

Lemon Squeezers—
See *Squeezers, Lemon.*

Lifters, Transom—
Dickson:
8 x 4 ft. x ¼.....₩ 100 $10.00
Other sizes, Iron.....70&10&10%
Other sizes, Brass.....70&10%
Excelsior.....60@60&10%
Payson's:
Solid Grip Nos. 303 and 304, ₩ 100, $11.00
Other sizes.....70&10%

Lines—
Wire Clothes, Nos...	*18*	*19*	*20*
100 feet	*$2.50*	*$ 2.25*	*$ 2.00*
75 feet			*$1.50*

Ossawan Mills,
Crown Solid Braided Chalk.....33⅓%
Mason's, No. 0 to No. 5.....33⅓%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₩ gr.....30%

Locks, &c.— Cabinet—
Cabinet Locks.....*33⅓&2%*

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading.....60@60&10%
R. & E. Mfg. Co.....50&10@60&5%
Sargent & Co.....60@60&10%
S. B. & Co., Locks, Knobs, &c..40@40&5%

Elevator—
Stowell's.....33⅓%

Padlocks—
Wrought Iron, list Dec. 5, '97.....*75@75&10%*
Dog Collar, S. B. Co.....40%
R. & E. Mfg. Co. Wrt. Steel and Brass.50%
S. B. & Co.....40%

Sash, &c.—
Fitch's Patent.....65&10%
Ives' Patent.....65@65&10%
Payson's Perfect.....70%
Payson's Signal.....70&10%
Reading.....60&10&10@70%

Machines—
Boring—
	Without Augers. Upright.	Angular.
Douglas	$2.50	$3.00
Jennings'	2.50	3.00
Millers' Falls		5.75
Snell's, Rice's Pat.	2.50	2.75

Fluting—
Crown Jewel, 6 in.....$2.50@2.75

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.20%

Washing—
Wayne American, No. 2, ₩ doz. $27.50
Western Star, No. 2, ₩ doz. 27.50
Western Star, No. 3, ₩ doz. 30.00
St. Louis, No. 41, ₩ doz. 68.00
Carload lots, f.o.b. factory, freight allowed.

Mallets—
Hickory.....*50@50&10%*
Lignumvitæ.....*50@50&10%*
Tinners', Hickory and Applewood, doz.....*65@60c*
Fiber Head, Stearns'.....35%

Mattocks—
List Feb. 23, 1899.....70@70&10%

Meat Cutters—
See *Cutters, Meat.*

Milk Cans—See *Cans, Milk.*

Mills— Coffee—
Box and Side, list Jan. 1, '98.....*60&10@60&10&10%*
Net prices are often made on some goods which are lower than above discounts.
Enterprise Mfg. Co., list Jan. 17, '93..30%
National, list Jan. 1, '94.....30%
Parker's Columbia and Victor....60&10%
Parker's Upright.....30&10@40%
Swift, Lane Bros.....33⅓%

Mincing Knives—
See *Knives, Mincing.*

Molasses Gates—
See *Gates, Molasses.*

Money Drawers—
See *Drawers, Money.*

Mowers, Lawn—
Net prices are generally quoted.
	10	*12*	*14*	*16-inch*
Cheap.....	*$1.65*	*$1.70*	*$1.75*	*$1.80*
Medium....	*2.50*	*2.75*	*3.00*	*3.25*
High Grade	*3.50*	*3.75*	*4.00*	*4.25*

Pennsylvania and Continental.....60&10&10%
Philadelphia:
All Styles except A and E.....70&10%
Style A, all Steel.....60&10%
Style E, Low Wheel.....60&10%
Style E, High Wheel.....70&10%
Racine.....60&10&10%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List May 1, '92.....*85@85&5%*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—
Nos.	6	7	8	9	10
A. C.	25¢	23¢	22¢	21¢	21¢
					40&10&5%
American	9½	9½	9½	9½	9½...net
Ausable	28¢	26¢	25¢	24¢	23¢
					40&10&10%
Capewell	19¢	18¢	17¢	16¢	16¢10&5%
C. B. K.	25¢	23¢	22¢	21¢	21¢...40%
Champlain	28¢	26¢	25¢	24¢	23¢
					40&5&2%
Clinton Fin.	19¢	17¢	16¢	15¢	14¢30&5%
Maud S.	25¢	23¢	22¢	21¢	21¢
					50&10&5%
Neponset	23¢	21¢	20¢	19¢	18¢...40%
Putnam	23¢	21¢	20¢	19¢	18¢.33⅓&5%
Vulcan	23¢	21¢	20¢	19¢	18¢...35%

Picture—
	1½	*2*	*2½*	*3*	*3½ in.*
Brass Head.	*.90*	*.95*	*1.00*	*1.05*	*1.10 gro.*
Por. Head...	*.85*	*.90*	*.95*	*1.10*	*1.15 gro.*

Nippers, See *Pliers and Nippers.*

Nut Crackers—
See *Crackers, Nut.*

Nuts—List Feb. 1, 1899.
List Feb. 1, '99.
Cold Punched. *Off*
Mfrs. or U. S. Standard, list.
Hexagon, plain.....*6.20c*
Square, plain.....*5.90c*
Square, C. T. & R......*6.00c*
Hexagon, C. T. & R......*6.70c*
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd. Square.....*$6.90*
Hexagon.....*6.90*

Oakum—
Best or Government.....*lb. 5¾c*
Navy.....*lb. 4¾c*
U. S. Navy.....*lb. 5¼c*
Plumbers' Spun Navy.....*5¾c*
In carload lots ¼c lb. off f.o b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....*60&10@60%*
Zinc.....*70&10@75%*
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₩ doz. 20%
Malleable, Hammers' Old Pattern, same list.....50&10%
Wilmot & Hobbs Mfg. Co.....70&10@75%

Openers, Can—
French.....*doz. 35c*
Iron Handle.....*doz. 60@75c*
National, ₩ gro.....$1.75@2.00
Sardine Scissors.....₩ doz. $2.00@$2.10
Sprague, Iron or Wood Handles.....₩ doz. 40@45¢
Stowell's.....75&10%

Packing—
Rubber—
Standard, fair quality....70&10@75%
Inferior quality.....75&10@80%
Extra.....*60&5@60&10&5%*
Jenkins' Standard, ₩ ℔ 80¢...85@25&5%

Miscellaneous—
American Packing.....*9@10c lb.*
Cotton Packing.....*13@14c lb.*
Italian Packing.....*10½@11½c lb.*
Jute.....*5@5½c lb.*
Russia Packing.....*12@13c lb.*

Pails—
Creamery—
S. S. & Co., with gauges.. No 1 $5.95; No. 2, $5.50 ₩ doz.....15%

Galvanized—
Inch.....	*10*	*12*	*14*
Water, Standard, gro.....	*$18.00*	*$21 00*	*$24.00*
Water, Competition, gro.....	*17.00*	*19.50*	*22.00*
Fire, gro.....	*23.00*	*25.00*	*28.00*
Well, gro.....	*23.00*	*25.00*	*27.00*

Pans—
Dripping—
Large Sizes.....*lb. 4 @4¼c*
Small Sizes.....*lb. 4½@4¾c*

Fry—
Standard List.....*80@80&10%*
Acme Fry Pans.....75@75&10%

Roasting and Baking—
Columbian, S. S. & Co., Nos. 5, ₩ doz. $10; 10, $11.50; 20, $13; 30, $15....60%
Simplex No. 08, ₩ doz. $7.00; No. 09, $8.50.....60%

Paper—
Building Paper—
	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 20 sq. ft. to lb.	*$0.35@0.40*
Medium wt., 12 sq. ft. to lb.	*$0.55@0.60*
Heavy wt., extra quality.	*$0.95@1.05*
Barrett's Water Proof Sheathing.	*$1.35@1.75*
Medium Grades Water Proof Sheathing	*$0.80@1.25*
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton	*$42.50*

Tarred Paper.
1 ply (roll 300 sq ft.), ton $35.00@37.00
2 ply, heavy, roll 100 sq. ft......*90c*
2 ply, light, roll 100 sq. ft......*75c*
3 ply, heavy, roll 100 sq. ft......*$1.20*
3 ply, light, roll 100 sq. ft.....*$1.00*

Sand and Emery—
List April 19, 1898.....*50c10c5@60%*

Parers—
Apple—
Advance.....₩ doz. $4.50
Baldwin.....₩ doz. $5.00
Bonanza.....each $5.00
Dandy.....each $7.50
Eureka, 1888.....each $16.00
Family Bay State.....₩ doz. $12.00
Hudson's Little Star.....₩ doz. $4.00
Hudson's Rocking Table....₩ doz $5.50
Improved Bay State ₩ doz. $37.00@30.00
New Lightning.....₩ doz. $5.50
Reading 72.....₩ doz. $4.00
Reading 78.....₩ doz. $7.00
Turn Table.....₩ doz. $4.50
White Mountain.....₩ doz. $4.00

Potato—
Saratoga.....₩ doz. $5.50
White Mountain.....₩ doz. $4.50

Paris Green—
Arsenic, kegs or casks..lb. 12 @12½c
Kegs of 100 to 175 pounds.....*lb. 13½@13 c*
Kits of 14, 28 and 56 pounds.....*lb. 13½@14 c*
Paper boxes 2 to 5 pnds.lb. 13½@ 14c
Paper boxes 1 pound...lb. 14 @14½c
Paper boxes ½ pound..lb. 15 @15½c
Paper boxes ¼ pound..lb 16 @16½c
Note.—These prices are sometimes shaded by jobbers.

Picks and Mattocks—
List Feb 23, 1899.....70@70c10%

Pinking Irons—
See *Irons, Pinking.*

Pins—
Escutcheon—
Brass.....*60@60c5%*
Iron, list Nov. 11, '85.....*60@60c5%*

Pipe, Cast Iron Soil—
Factory Shipments.
Standard, 2-6 in.....*70%*
Extra Heavy, 2 6 in.....*70c5%*
Fittings.....*75%*

Pipe, Wrought—
Factory Shipments.
List February, 1899.
Plain and Galvanized:
Carload lots.....*60c10c10c10c5%*
Less than carload lots.....*60c10c10c10%*
Screw and Socket Casing.....*58½@5%*
Inserted Joint Casing.....*47½c5%*
Cold Drawn Seamless Steel Tubing.....*60%*

Planes and Plane Irons—
Wood Planes—
Molding.....*45@45c5%*
Bench, First quality....*50c5@50c10%*
Bench, Second quality..*50c10c5@60%*
Bailey's (Stanley R. & L. Co) 50&10&10@50&10&10&10%
Gage Self Setting.....35%

Iron Planes—
Bailey's (Stanley R. & L. Co) 50&10&10@50&10&10&10%
Chaplin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....25&10&10@25&10&10&10%
Sargent's.....60&10&10@70%

Plane Irons—
Standard List.....*30c10@30c10c10%*
Buck Bros.....30%
Butcher's.....$5.00@$5.25 to £
Stanley R. & L. Co...50&10@50&10&10%
L. & I. J. White.....20&5@25%

Plates—
Felloe.....*lb. 5½@5¾c*
Self-Sealing Pie Plates (S. S. & Co.), ₩ doz. $2.00.....50%

Pliers and Nippers—
Gas....	*7*	*8*	*9*	*10-in.*
Best.....	*$5.25*	*$6.00*	*$6.50*	*doz.*
Good....*$3.50*	*3.75*	*4.00*	*4.50*	*doz.*

Acme Nippers.....50%
Bernard's:
Parallel Pliers, &c.....33⅓%
Paragon Pliers.....50%
Lodi Pliers.....50%
Elm City Fence Pliers.....35%
Button's.....70&10@70&10&5%
Heller's Farriers' Pincers and Tools.....40@40&5%
Morrill's Parallel, ₩ doz. $12.00...30&5%
P., S. & W. Cast Steel.....50@50&5%
P., S. & W. Tinners' Cutting Nippers, add 5%.....10%
Utica Drop Forge & Tool Co.:
Combination Pliers.....40&5%
Side Cutting Pliers.....40&5%
Hall Patent Nipper.....40&5%
Round and Flat Nose Pliers.....40&5%
End Cutting Pliers.....40&5%
Royal Blue.....40&5%
Glass Pliers.....40&5%
Burner Pliers.....40&5%

Plumbs and Levels—
Plumbs and Levels.....*70c10c10@70c10c10c10%*
Disston's.....70%
Pocket Levels.....75&10&10@75&10%
Stanley R. & L. Co.....70&10&10@70&10&10&10%
Stanley's Duplex.....25&10@25&10&10%
Woods' Extension.....33⅓%

Poachers, Egg—
Buffalo Steam Egg Poachers, ₩ doz. No. 1, $4.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—
Bulk and 1 lb. papers.. lb. 10½@11¼c
½-lb. papers.....*lb. 11 @12 c*
¼-lb. papers.....*lb. 11½@12½c*

Pokes, Animal—
Ft. Madison Hawkeye.....₩ doz. $3.00
Ft. Madison, Western.....₩ doz. $3.50
Metallic Horse Poke.....₩ doz. $5.00

Police Goods—
Manufacturers' Lists.....*25@25&10%*
Tower's.....25%

Polish—Metal—
Prestoline Liquid, No. 1 (¼ pt.), ₩ doz. $3.00; No. 2 (1 qt.), $9.72.....40%
Prestoline Paste.....33⅓@40%
U. S. Metal Polish Paste, 3 oz. boxes, ₩ doz. 50¢; ₩ gr. $4.50; ¼ ℔ boxes, ₩ doz. $1.25; 1 ℔ boxes, ₩ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₩ doz. $1.25; ₩ gr. $12.00.
Barkeepers' Friend Metal Polish, ₩ doz. $1.75; ₩ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ₩ doz. $1.50

Stove—
Joseph Dixon's, ₩ gr. $5.75.....10%
Dixon's Plumbago.....₩ ℔ 5¢
Fireside.....₩ gr. $2.50
Gem, ₩ gr. $4.50.....10%
Japanese.....₩ gr. $3.50
Jet Black.....₩ gr. $3.50
Wynn's Black Silk, 5 ℔ pail.....₩ ℔ 12¢
Wynn's Black Silk, ½ ℔ box, ₩ doz. $1.00
Wynn's Black Silk, 8 oz. box, ₩ doz. $0.75
Wynn's Black Silk, 8 oz. liq., ₩ doz. $1.00

Poppers, Corn—
Round or Square:
1 qt.....*gro. $6.00*
1½ qt.....*gro. 8.00*
2 qt.....*gro. 10.00*
Quincy Corn Popper, 1 qt., ₩ gr. $17.00; 2 qt., $22.00.

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Potato Parers—
See *Parers, Potato.*

Pots— Glue—
Enameled.....*40c10c25@50%*
Tinned.....*40c25@40c10%*

Powder—
In Canisters:
Duck, 1 lb. each.....*45c*
Fine Sporting, 1 lb. each.....*75c*
Rifle, ½-lb. each.....*45c*
Rifle, 1-lb. each.....*85c*
In Kegs:
Duck, 6½-lb. kegs.....*$2.25*
Duck, 12½-lb. kegs.....*$4.25*
Duck, 25-lb kegs.....*$8.00*
Rifle, 6¼-lb. kegs.....*$2.25*
Rifle, 12½-lb. kegs.....*$4.25*
Rifle, 25-lb. kegs.....*$8.00*
King's Smokeless:
Keg (25 ℔ bulk).....$30.00
Half Keg (12½ ℔ bulk).....$15.25
Quarter Keg (6¼ ℔ bulk).....$8.25
Canister (1 ℔ bulk).....$0.90
Case, 1 ℔ Canisters (50 ℔ bulk).....$45.00
Half Case, 1 ℔ Canisters (25 ℔ bulk).....$23.75
King's Semi-Smokeless:
Keg (25 ℔ bulk).....$16.00
Half Keg (12½ ℔ bulk).....$8.25
Quarter Keg (6¼ ℔ bulk).....$4.75
One Pound Can, bulk.....$0.50
25&10&5%
25&10%

Presses—
Fruit and Jelly—
Enterprise Mfg Co.....35@30%

Pruning Hooks and Shears—See *Shears.*

Pullers, Nail—
Crown, ₩ doz. $18.00.....50%
Crown Prince, ₩ doz. $15.00.....50%
Giant, No. 1, ₩ doz. $18; No. 2, $16.50; No. 3, $15.....40%
National, ₩ doz. $24.00.....40%
Pelican, ₩ doz. $9.00.....15&10%
Scranton No. 1 and 2, ₩ doz.....$10.00
Scranton, No. 3, ₩ doz.....$9.50

Pulleys—

Hay Fork, Swivel or Solid Eye..... doz. $1.50

Hay Fork, Stowell's Anti-Friction, 5-in. Wheel, ₱ doz. $12.00 ..... 40%
Hay Fork, Stearns' No. 15 & 25 ₱ doz. $1.75
Hay Fork, Stearns' No. 35 & 45 ₱ doz. $2.00
Hay Fork, Stearns' Nos. 56 & 66. ...$2.25
Hot House, Awning, &c.....60@60&10%
Japanned Clothes Line.....60@60&10%
Japanned Screw.....70&10&10%
Japanned Side.....70&10&10%
Stowell's Ceiling or End, Anti-Friction 40%
Stowell's Dumb Waiter, Anti-Friction 50%
Stowell's Electric Light..... ....33⅓%
Stowell's Side, Anti-Friction.....50%
Sash (Auger Mortise):
Common Sense, 1¾ in., ₱ doz., 18¢; 2 in., 20¢.
Empire.....1¾ in., 17¢; 2 in., 19¢
L. C.....1¾ in., 15¢; 2 in. 17¢
Ideal No. 13.....1¾ in., ₱ doz., 15½¢
Improved.....1¾ in., 17¢; 2 in., 19¢
Niagara.....1¾ in., 16¢; 2 in., 17¢
No. 26, Troy.....1¾ in., 15¢; 2 in., 17¢
Star..... .....1¾ in., 16¢; 2 in., 17¢
Acme.....1¾ in., 18¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cistern .....65@65&10%
Pitcher Spout .....75@75&10%
Pump Leathers, all sizes....gro. $6.00
Flint & Walling's Fast Mail.....60%
Myer's Pumps, low list 55%
Contractors' Rubber Diaphragm Non-chokable, B. & L. Block Co.....20%

Punches—

Revolving..... .....doz. $3.50@3.75
Saddlers' or Drive, good...doz. 60@65c
Spring, good quality..... $1.70@1 80
Bemis & Call Co.'s Cast Steel Drive.50&5%
Bemis & Call Co.'s Check.....55%
Bemis & Call Co.'s Spring.....50&5%
Bemis & Call Co.'s Springfield Socket..65%
Niagara Hollow Punches.....45%
Niagara Solid Punches... .....55%
Spring, Leach's Pat. 15%
Steel Screw, B. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co....20&2%
Tinners' Solid, P., S. & W.Co., ₱ doz., $1.44.....55%

Rail—

Barn Door, &c.—

Barn Door, Light..In.	½	⅝	¾
100 feet.....	*$1.50*	*$1.95*	*$2.60*

B. D., for N. E. Hangers:

	Small.	*Med.*	*Large.*
100 feet.....	*$1.00*	*2.00*	*2.50*

Sliding Door, Bronzed Wr't Iron, ft. 6¼¢
Sliding Door, Iron Painted..2¼@2½¢
Sliding Door, Wrought Brass, 1¼ in. .. .. lb. 36c..30%
Cronk's Double Braced Steel Rail, ₱ foot.....3¢
Lanes' O. N. T., ₱ 100 ft.....$2.40
Lanes' Standard, ₱ ft. .....3¼¢
McKinney's None Better.....₱ ft. 2¾¢
McKinney's Standard... .....₱ ft. 3¼¢
Moore's, W'r't, Bracket, Steel.....$2.40
Stowell's Steel Rail.....35&10%
Terry's Steel Rail .....₱ ft. 3¼¢

Rakes—

1895 or old list often used:
C. S Rakes..... .....60&10&2%
Malleable Rakes .....70&10&2%
Association List:
Cast Steel..... .....75&5&2%
Malleable.....70&10%
Fort Madison Red Head Lawn.....$3.00
Fort Madison Blue Head Lawn.....$2.65

Rasps, Horse—

D ston's 75%
New Nicholson Horse Rasp.....70&10%
See also *Files.*

Razor Strops—

See *Strops, Razor.*

Reels—

Clothes Line—

Stearns'.....33⅓&10%

Fishing—

Hendryx Aluminum, German Silver, Gold, Bronze, Silver, Rubber, Populo and Salmon, Single Action, Multiplying and Quadruple, all sizes.....25%
Hendryx Single Action Series, 102P and PN, 202P and PN, 102 PR and PRN, 202 PR and PRN, 304 P and PN, 00304P and PN, 502 and 502N, 802 and 802N, 02084N, Competitor.50%
Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 2004N, 2904P and PN, 002904PN, 0924 and 0924N, 5009N and PN.....40&10%

Registers—

For points on Mississippi River and East:
Black Japanned.....50%
White Japanned.....50%
Bronzed Finishes.....40%
Nickel Plated.....50%
Electro Plated in Brass, &c.....40%
White Porcelain.....30%
Solid Brass and Bronze Metal..25%
Note—Higher prices are quoted in territory further West

Rings and Ringers—

Bull Rings—

	2	*2½*	*3 Inch.*
Steel.....	*$0.90*	*1.00*	*1.05 doz.*
Copper.....	*1.10*	*1.20*	*1.35 doz.*

Hog Rings and Ringers—

Hill's Rings...gro. boxes, $3.25@3.50
Hill's Ringers, G. I.....doz. 50@55c
Blair's Rings..... ₱ gro. $3.75@4.00
Blair's Ringers..... ₱ doz. 55¢@60¢
Brown's Rings..... ₱ gro. $3.75@4.00
Brown's Ringers..... ₱ doz. 55¢@60¢
Perfect Rings.....₱ gro. $7.00@7.50
Perfect Ringers, ₱ doz.....75@80¢

Rivets and Burrs—

Copper.....40&10@10&50%
Iron or Steel:
Tinners'.....65@65&10%
Miscellaneous.....65@65&10%

Rivet Sets—See *Sets.*

Roasting and Baking Pans—See *Pans, Roasting and Baking.*

Rollers—

Acme Stowell's Anti-Friction....50&10%
Barn Door, Sargent's list.60&10&10@70%
Lane's, Stay ....33⅓&5%
Stowell's Barn Door Stay...₱ doz. $1.00

Rope—

Manila, 7-16 in. and larger. lb. 9½@ 9¾c
Manila.....¾-inch lb. 10@10¼c
Manila..¼ and 5-16 in. lb. 10¼@10¾c
Manila, Tarred Rope, 15 thread.....lb. 9½@ 9¾c
Manila Hay Rope Med'm.lb 9½@ 9¾c
Sisal, 7-16 in. and larger, lb. 8½@ 8¾c
Sisal ....¾-inch. lb. 9@ 9¼c
Sisal....¼ and 5-16 in. lb. 9½@ 9¾c
Sisal, Hay Rope, 2 to 10 ply.....lb. 8½@ 8¾c
Sisal, Med'm Lath Yarn.lb.. 8@ 8¼c
Cotton Rope:
Best, ¼-in. and larger..lb. 13@14 c
Med'm, ¼-in. and larger lb. 10@12 c
Com., ¼-in. and larger.lb. 8@10 c
Jute Rope.....lb. 5½@6 c

Wire Rope—

List Sept. 1, '94. All kinds.7½¢2½¢2%

Ropes, Hammock—

Covert Saddlery Works.....70%

Rules—

Boxwood...75¢10¢10¢10@75¢10¢10 ¢10¢10¢10%
Ivory ...40¢10¢10@40¢10¢10¢10¢10%
Lufkin's Steel.....50&10%
Lufkin's Lumber ... .50&10%
Stanley R. & L. Co.;
Boxwood.....
75&10&10@75&10&10&10&10%
Ivory..... .40&10&10@40&10&10&10%

Sad Irons—See *Irons, Sad.*

Sand and Emery Paper and Cloth—See *Paper and Cloth.*

Sash Cords—See *Cord, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers, Sausage.*

Saws—

Note.—Extra 5@10% often given on Circulars Cross Cuts, &c. and extra 5@7½ on Hand, Butcher, &c.
Atkins' Circular.....50%
Atkins' Band 50%
Atkins' Cross Cuts 40%
Atkins' Mulay, Mill and Drag.....50%
Atkins' One-Man Saw.....40&10%
Atkins' Wood Saws .....40&10%
Atkins' Hand, Compass, &c..... ....40%
Disston Circular Solid and Inserted Tooth..... 50%
Disston Band 2 to 14 in. wide.....60%
Disston Band ¾ to 1¾.....70%
Disston Crosscuts.....50%
Disston Narrow Crosscuts 55%
Disston Mulay, Mill and Drag.....50%
Disston Framed Wood saws.....35%
Disston Wood saw Blades.....40%
Disston Wood saw Rods.....25%
Disston Hand-saws, Nos. 12, 99, 9, 10, d100, D8, 120, 7½, 77, 8.....35%
Disston Hand Saws, Nos 7, 107, 10, 3, 1, 0, 00, Combination.....30%
Disston Compass, Keyhole, &c.....25%
Disston Butcher Saws and Blades....35%
C. E. Jennings & Co.'s.....25&5@30&5%
Peace Circular and Mill.....45&10%
Peace Cross Cuts, list Jan. 1, '93, 45&10&5%
Peace Hand, Panel and Rip....25&10&5%
Richardson's Circular and Mill...45&10%
Richardson's X Cuts, list Jan. 1, '93. 45&10&5%
Richardson's Hand, &c..... 25&10&5%
Simonds' Circular Saws.....45@50%
Simonds' Crescent Ground Cross Cut Saws.....35%
Simonds' One-Man Cross Cuts....40&10%
Simonds' Gang Mill, Mulay and Drag Saws.....45@45&5%

Hack Saws—

Disston Compass Blades.....25%
Disston Keystone.....30%
Disston Hack Saw Frames.....30%
Griffin's complete.....50&50&10%
Griffin's Hack Saw Blades....50@50&1 %
Star Hack Saws and Blades.....15&10%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Velocipede Scroll Saw, $18...20%
Barnes' Scroll Saw Blades.....40%
Lester, complete, $10.00.....15&10%
Rogers, complete $4.00.....15&10%

Saw Frames—See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Scale Beams—See *Beams, Scale.*

Scales—

Family, Turnbull's ... ...50@30&10%
Hatch, Counter, No. 171, good quality ..... doz. $17.00@18.00
Hatch, Tea, No. 161...doz $5.75@6.00
Union Platform, Plain . $2.00@2.10
Union Platform, Striped..$2.15@2 25
Chatillon's Eureka.....25%
Chatillon's Favorite.....40%
Chatillon's Grocers' Trip Scales.....50%
Peerless Scales — Family, Candy, Grocers' and Postal 33⅓%
"The Standard" Portables.....45@50%
"The Standard" R. R. and Wagon. ..60%

Scrapers—

Box, 1 Handle .....doz $2.00
Box, 2 Handle ..... doz. $3.00@4.00
Ship, No. 1, doz. $3.50; No 2, $2.25@2.40
Adjustable Box Scraper (S. R. & L. Co.) $6.00.....40&10%
Foos, W. E. Pratt Mfg. Co. ₱ doz. $1.15@$1.25
Ship, R. I. Tool Co.....10%

Screen Window and Door Frames—See *Frames.*

Screw Drivers—See *Drivers, Screw.*

Screws—

Bench and Hand—

Bench, Iron.....doz. 1 in., $2.20; 1¼, $2.65; 1¼, $3.00
Bench, Wood, Beech..doz. $2.00@2.20
Hand, Wood.....30&10@40&10%
Hand, Grand Rapids.....35%

Coach, Lag and Hand Rail—

Lag, Common Point, list Jan. 30, '95..... .....80@80&10%
Coach and Lag, Gimlet Point, list Jan. 30. '95.....80&5@80&10&5%
Hand Rail, list Jan. 1, '81....83⅓&2%

Jack Screws—

Millers Falls.....50&10&10%
Millers Falls, Roller .....50&10%
P., S. & W.....40@40&10%
Sargent.....70&10&10%
Stearns' .....40&10%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.....60%
Flat or Round Head, Brass.....50%

Set and Cap—

Set (Iron or Steel).....75@75&10%
Sq. Hd. Cap .....70@70&10%
Hex. Hd. Cap .....70@70&10%

Wood—

List Nov. 10, 1898.
Flat Head, Iron 85%
Round Head, Iron.....82½%
Flat Head, Brass .....80&10%
Round Head, Brass.....75&10%
Flat Head, Bronze .....75&10%
Round Head, Bronze.....75%
Rogers' Drive Screws.....*5%
Note.—An extra 5 or 10% is often given.

Scroll Saws—See *Saws, Scroll.*

Scythes—

Grass and Grain.....60&10%

Scythe Snaths—See *Snaths, Scythe.*

Seeders—

Raisin—

Enterprise.....25@30%

Sets—

Awl and Tool—

Brad Awl and Tool Sets:
Wood Hdle., 10 Awls.....doz. $2.00
Wood Hdle., 14 Awls, 6 Tools ... doz. $2.25@2.40
Aiken's Sets, Awls and Tools: No. 20, ₱ doz. $10.00, 60&10@60&10&5%
Fray's Adj. Tool H'dls...Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $5.50.....40&10@40&10&5%

Garden Tool Sets—

Ft. Madison Rakes, Shovel and Hoe.... ₱ doz.....$9.00

Nail—

Round, assorted .....gro. $3 00@3.50
Octagon .....gro. $4 00@4.75
Buck Brothers.....27½%
Cannon's Diamond Point, ₱ gr. $12...25%
Snell's Corrugated, Cup Pt.....50%
Snell's Knurled, Cup Pt..... ....66⅔%

Rivet—

Regular list .....70@70&10%

Saw—

Aiken's Genuine.....₱ doz. $4.50@5.00
Aiken's Imitation .....₱ doz. $3.00@3.10
Atkin's Criterion.....₱ doz. $6.00
Atkin's Adjustable.....₱ doz. $8.00
Bemis & Call Co.'s Cross Cut.....30&5%
Bemis & Call Co.'s Plate.....20%
Bemis & Call Spring Hammer.....30&5%
Disston's Star and Mona ch.....25%
Hammer, Bemis & Call Co.'s new Pat.45%
Morrill's No. 1, $15.00.....40&20%
Nos. 3 and 4, Cross Cut, $23.00..40&20%
No. 5, Mill, $31.00.....40&20%
No. 10, $15.50.....40&20%
No. 11, $16.00.....40&20%
Stillman ..... ₱ doz. $1.00
Taintor Positive, ₱ doz. $18 .....60%

Sharpeners, Knife—

Tanite Mills ₱ gross, $14.40....25@33⅓%

Shaves, Spoke—

Iron..... ....doz. $1 00@1 25
Wood..... .....doz. $1.75@2.00
Bailey's (Stanley R. & L. Co.).....50&10%
Goodell's, ₱ doz. $9.00.....15&10%
Stearns'.....40&10%

Shears—

Cast Iron....	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good.....	*$13.00*	*15.00*	*17 00 gro.*
Cheap.... $9.00		*10 00*	*11.00 gro.*

Straight Trimmers, &c.:
Good quality.....70¢10@75¢10%
Second quality..... .....80¢10@85%
Acme Cast Shears.....40@40&5%
Davenport Cutlery Co.....60@60&10%
Heinisch's Tailors' Shears.....40@40&5%
Seymour's, list Dec. '81.....60&10&10@70&5%
Seymour's Nickel.....50&10@60&5%
Seymour's Tailors' Shears.....40@40&5%
Wilkinson's Hedge.....50%
Wilkinson's Sheep.....15%

Tinners' Snips—

Forged Handles, Steel Blades..20¢10% Malleable Handles, Laid with Steel. 40%
Forged Handles, Steel Blades, Berlin. 40¢10%
Niagara Snips.....40%
Seymour's..... .....60&10&10@70&5%

Pruning Shears and Tools—

Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25@25&10%
Disston's Pruning Hook, ₱ doz. $12.00 25@25&10%
John T. Henry Mfg. Company: Henry's Genuine, Nos. 1, 2 and 22 ... 50&10%
Henry's Pattern, No. 20.....50&25%
Henry's Pattern, No. 21 .....50&30%
Conn. Pattern, Nos. 32, 33 and 3.50&25%
Conn. Pattern, No. 4.....50&20%
Henry's Orange Shears.....50&30%
Henry's Grape Shears..... ...50&20%
Henry's Tree Pruners.....75%
P., S. & W. Co.....60%
Seymour's.....60@10&10@70&5%

Sheaves—Sliding Door—

Stowell's Anti-Friction.....50%
Patent Roller..... ..60&10@60&10&5%
Patent Roller Hatfield's, Sargent's list, 80&10@80&10&7%
Reading..... .....70&10@75%
R. & E..... 40&10@60&10&5%
Wrightsville, Hatfield Pattern...80&10%

Sliding Shutter—

Reading list.....70&10@75%
R. & E.....60@60&10%
Sargent's list.....60@60&10%

Shells—

Brass Shot Shells, Club, Rival, Climax, 65&2%
Brass Shot Shells, first quality.....60&2%
First quality 4, 8, 10 and 12 gauge, 25&10&2%
First quality Rival, Club and Climax brands, 14, 16 and 20 gauge ($7.50 list).....20&10&2%
New Victor, all gauges.....15&2%
Quick Shot and Leader.....33⅓&5&2%
Smokeless brand, 12, 10, 16 gauge 33⅓&10&2%
Star, Club, Rival and Climax Brands . 33⅓&10&2%
Trap brand, 12 and 10 gauge.33⅓&10&2%

Shells, Loaded—

Loaded with Black Powder..... 40¢5@40¢10%
Loaded with Nitro Powder..... 40¢10¢10¢5@40¢10¢10¢10%
Loaded with Semi-Smokeless Powder..... 40¢5@40¢10%

Ship Tools—

L. & I. J. White 25%

Shoes, Horse, Mule, &c.—

Factory Shipments:
No. 2 and larger.....per 100 lbs., $5.35

Shot—

Drop, up to B, 25-lb. bag...$1.40@1.45
Drop, up to B, 5-lb. bag ..... .50
Drop, B and larger, 25-lb. bag.... $1.65@1.70
Drop, B and larger, 5-lb. bag..... .35
Buck, 25 lb. bag..... .....$1.65@1.70
Buck, 5-lb. bag..... .35
Chilled, 25 lb. bag.....$1.68@1.73
Dust Shot, 25 lb. bag 2.00
Dust Shot, 5-lb. bag ..... .50
These prices are often shaded 5 @10c. 25 lb. bag, especially in the West and merchants often undersell the manufacturers.

Shovels and Spades—

Combination price to small trade are as follows:
No. 2, Polished, Sq. or Rd. Point, D or L Handle:

	A1.	*B2.*
	1st Grade.	*2d Grade.*
Plain Back....	*$9.50*	*$8.40*
Strap Back.....	*8.70*	*7.80*
Cleveland Pat'n	*9.00*	*8 10*

	C3.	*D4.*
	3d Grade.	*4th Grade.*
Plain Back....	*$7.50*	*$6.90*
Strap Back.....	*6.90*	*6.30*
Cleveland Pat'n	*7.20*	*6.60*

All other sizes add 30c doz. Black deduct 30c doz.
Note.—Above prices often shaded by jobbers.

Shovels and Tongs—

Brass Head .....60&10@60&10&10%
Iron Head.....60&10@60&10&5%

Sieves and Sifters—

Hunter's Imitation...gro. $9.00@9.50
Buffalo Metallic, S. S. & Co., ₩ gr.:

	16	16&18	18	18&20
Blued	$10.80	$11.40	$11.40	$12.00
Tinned	11.40	12.00	12.00	12.60

Eclipse.....₩ gr. $9.00@ 9.50
Hunter's Genuine....₩ gr. $10.00@10.50
Shaker (Barler's Pat.) Flour Sifters.
₩ doz., $2.00.....33%

Sieves, Wooden Rim—

	Iron.	Plated.
Mesh 18, Nested, doz	$0.70	$0 85
Mesh 20, Nested, doz	.90	1 05
Mesh 24, Nested, doz	1.05	1 20

Sinks—

Cast Iron—

High list ..... 75&5@75&10%
Low list .....60&10&10@70%

Wrought Steel—

Columbus Galv'd and Enameled.50&10%
Columbus, Painted.....30&10%
L. & G... .....50&10%

Slates—

"*D*" *Slates*..... 50&10@50&10&10%
Unexcelled Noiseless Slates.....
60&6 tens@60&6 tens&5%
Wire Bound.....40&10@50%
Double Slates, add $1 case, net.

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German.....50@50&5%
Covert Mfg. Co.:
Deroy.....45&3%
High Grade.....45&2%
Jockey.....45&2%
Trojan.....45&2%
Covert's Saddlery Works:
Banner.....75%
Crown.....70%
Triumph 70%
W. & E. T. Fitch:
Bristol ..... 40&10%
Empire.....50&5%
National.....50&5%
Clipper..... 50&10&5%
Champion.....40&10%
Victor .....60&5%
Sargent's Patent Guarded.....
70&10@70&10&10%

Snaths—

Scythe.....55%

Snips, Tinners'—See *Shears.*

Soldering Irons—

See *Irons, Soldering.*

Spoke Trimmers—

See *Trimmers, Spoke.*

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp Co.'s list....
75&10@80%
Solid Table and Tea, Cen. Stamp Co.'s list..... .....70&25%

Silver Plated—

Flat Ware .....50&10@60&10%
Wm. Rogers M'g. Co.....50&10%

Miscellaneous—

German Silver ....60&10%
Wm. Rogers Mfg. Co.:
18% German Silver.....60%
Rogers' Silver Metal.....50&10%

Springs—

Door—

Gem (Coil).....30%
Rubber, complete.....₩ gro. $15.00
Star (Coil).....30%
Torrey's Rod, 39 in....₩ doz. $1.10@1.25
Warner's No. 1, ₩ doz. $1.50; No. 2, $3.40..... 55&55&10%
Victor (Coil).....60&10@60&10&5%

Carriage, Wagon, &c.

Elliptic, Concord, Platform and Half Scroll, 60&10@60&10&5 or following net prices:

	Tempered. Blk.	Brt.	Oil Temper'd. Blk.	Brt.
1¼ in	5½c	5¾c	6 c	6¼c
1⅜ in	5½c	5¾c	6 c	6¼c
1½ in	5¾c	5½c	5¾c	6 c

Cliff's Bolster Springs.....40&2%
Cliff's Seat Springs.....₩ pair 45¢

Sprinklers, Lawn—

Enterprise.....25@30%
Philadelphia No. 1, ₩ doz. $12; No. 2, $15; No. 3, $24.....35%

Squares—

Nickel plated.... } *List May 1, '95..*
Steel and Iron... } 75&10@75&10&5%
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels.
40&10@40&10&10%
Disston's Try Sq. and T-Bevels....60&10%
Whitcomb's Try and Miter...50&10%

Squeezers—

Lemon—

Wood, Common, gro., No. 0. $5.00; No. 1, $6.50; No. 2, $10.00.
Wood, Porcelain Lined:
Cheap .....doz. $2.50@2.75
Good Grade..... .doz. $3.00@3.50
Tinned Iron .....doz. $0.80@1.25
Iron, Porcelain Lined doz. $3.25@3 50
Jennings' Star.....₩ doz. $1.85@1.90
King.....₩ doz. $2.00

Staples—

Barbed Blind..... ..... lb. 7¼@8c
Electricians', Association list..80&10%
Fence Staples, same price as Barbed Wire. See Trade Report.
Poultry Netting.....lb. 4@4½c
Grand Crossing Tack Co.'s list....75&10%

Steels, Butchers'—

Dick's.....40%
Foster Bros'.....40%
C. & A. Hoffmann's.....40%
Nichols Bros.....50%
John Wilson's, list Sept. 1, '94.....25%

Steelyards.....40@40&10%

Stocks and Dies—

Blacksmiths'..... .....35@40%
Gardner..... .....40&10%
Green River.. .....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%
Reversible Ratchet.....25%

Stone—

Scythe Stones—

Pike Mfg. Co., list '95-'96.....33⅓%
Cleveland Stone Co., list Nov., '92..33⅓%

Oil Stones, &c.

Pike Mfg. Co.:
Hindostan No. 1, ₩ D...8¢
Sand Stone.....5¢
Turkey Oil Stone, Extra, 5 to 8 in.....80¢ } 33⅓@33⅓&10%
Turkey Slips.....$2.00
Lily White Washita.....60¢
Rosy Red Washita.....60¢
Washita Stone, Extra.....50¢
Washita Stone, No. 1.....40¢
Washita Stone, No. 2.....30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Arkansas Stone, No. 1, 3 to 5 in. $2.50 } 33⅓@33⅓&10%
Arkansas Stone, No. 1, 5½ to 8 in. $3.50
Tanite Mills:
Emery Oil, ₩ doz. $5.00.....50@60%

Stoners—

Cherry—

Enterprise..... .....25@30%

Stops, Bench—

Millers Falls.....15&10%
Morrill's...₩ doz., No. 1, $10.00; No. 2, $11.00, 40&20%
Stearns'.....30&5%

Stops, Window—

Taplin's..... .....45%

Stove Boards—

See *Boards, Stove.*

Stove Polish—See *Polish, Stove.*

Straps, Box—

Cary's Universal .....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points ..doz. 70@75c
Cast Steel, Polished.....*doz. $2.25*
Socket.....*doz. $1.75*

Stuffers, Sausage—

Miles' Challenge, ₩ doz. $20...50@50&5%
Enterprise Mfg. Co., list Jan. 17, '93.... 25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....25%

Tacks, Brads, &c.—

List Jan. 15, '99.
Carpet Tacks:
American Blued.....90&20@90&35%
American Tinned...90&20@90&35%
American Cut Tacks..90&20@90&25%
Suedes Iron Tacks.....90&25@90&30%
Upholsterers' Tacks.90&10&10@90&50%
Gimp Tacks.....90&10&10@90&50%
Lace Tacks.....85&20@90%
Trimmers' Tacks.....90&20@90&30%
Looking Glass Tacks.....75%
Bill Posters' and Railroad Tacks....
90&25@90&55%
Hungarian Nails.....80&10@80&15%
Common and Patent Brads.75@75&5%
Trunk and Clout Nails:
Blued ....80&10%
Tinned ....80&10%

Miscellaneous—

Double Point Tacks.....90&5@....%
Steel Wire Brads, R. & E. Mfg. Co.'s list.....50&10@60%
See also *Nails, Wire.*

Tanks, Oil—

Emerald, S. S. & Co.....30-gal. $3.00
Emerald, S. S. & Co.....60-gal., $3.75
QueenCity S. S. & Co., 60-gal..each, $4.00; 100-gal., $6.25; 120-gal., $8.50; 200-gal., $14.00; 250-gal.. ..... $17.75

Tapes, Measuring—

American Asses' Skin .....40&10@50%
Patent Leather.....25@25&10%
Steel ....33⅓@40%
Chesterman's..... .....25@25&5%
Keuffel & Esser Co., Steel and Metallic, new list, 1898.....35%
Lufkin's Steel and Metallic .....
33⅓@33⅓&5%

Thermometers—

Tin Case.....80&10%

Ties, Bale—Steel.

Standard Wire. .....50&10&5%

Ties, Wall—

Cleveland, Steel.....₩ 1000, $10.00

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tobacco Cutters—

See *Cutters, Tobacco.*

Tools—

Coopers'—

L. & I. J. White .....20@20&5%

Saw—

Atkins' new list.....40%
Simonds' 33⅓%

Transom Lifters—

See *Lifters, Transom.*

Traps—Game—

Newhouse.....50&5@50&10%
Oneida Pattern.....80@80&5%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes.8@9c
Mouse, Round or Square Wire.....
doz. $0.85@1.00
Dandy.....₩ doz. $1.75
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat.....₩ doz. $15.00
No. 3, Rat.....₩ doz. $5.85
No. 3½, Rat.....₩ doz. $4.50
No. 4, Mouse.....₩ doz. $4.30
No. 5, Mouse.....₩ doz. $3.00
Schuyler's Rat Killer, No. 1, ₩ gr. $13.50; No. 2, ₩ gr. $15.00
Out o' Sight, Mouse, No. 1, ₩ doz. 60¢; Rat, No. 2, $1.25; Mole, $6.00; Gopher, $1.50; Stop Thief, No. 1, $1.25; No. 2, $1.50.

Fly—

Balloon, Globe or Acme.....
doz. $1 25; gro. $14.50@15.00
Harper, Champion or Paragon
doz. $1.50; gro. $17.00

Trimmers, Spoke—

Bonney's No. 1, ₩ doz. $2.75; No. 2, $3.75
Douglas', ₩ doz. $9.00.....30%
Stearns' .....20&10%

Trowels—

Disston Brick and Pointing..... .....30%
Disston Plastering.....25%
Disston "Standard Brand" and Garden Trowels.....40%
Peace's Plastering..... .....25@25&5%
Rose Brick and Plastering...30@30&10%
Woodrough & McParlin, Pl'st'ring.25&10%

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list.....40%
Daisy Stove Trucks, Improved pattern
₩ doz. $18.00

Tubs, Wash—

	No. 1	2	3
Galvanized, ₩ doz.	$4.00	4 50	5.00

Galvernized S. S. & Co., with Wringer Attachment, ₩ doz., No. 10, $6.25; No. 20, $6.75; No. 30.....$7 50

Twine—

Binder—

White Sisal, 500 feet to lb..... 9¾c
Standard, 500 feet to lb..... 9¼c
Manila, 600 feet to lb 10¼c
Pure Manila, 650 feet to lb.....10¾c

Miscellaneous—

Flax Twine—	*BC*	*B.*
No. 9, ¼ and ½-lb. Balls	20c	24c
No. 12, ¼ and ½-lb Balls	17c	20c
No. 18, ¼ and ½-lb. Balls	14c	17c
No. 24, ¼ and ½-lb. Balls	11c	14c
No 36, ¼ and ½-lb. Balls	13c	16c

Chalk Line, Cotton, ½-lb. Balls.... 18@20c
Cotton Mops, 6, 9, 12 and 15 lb. to doz ..... 8@9c
Cotton Wrapping, 5 Balls to lb .... 2@18c
American 2-Ply Hemp, ¼ and ½-lb. Balls ..... 9@10c
American 3-Ply Hemp, 1-lb. Balls.. 9@10c
American 3-Ply Hemp, 1-lb. Balls (Spring Twine) ..... 10@11c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine). 8c
India 3-Ply Hemp, 1-lb. Balls.....8c
India 3-Ply Hemp, 1½-lb. Balls.... 7@7½c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls.6½c
Mason Line, Linen, ½-lb. Balls.. 45c
No. 2½ Mattress, ¼ and ½-lb. Balls 8½c
Wool.....5@5½c

Vises—

Solid Box .....60@60&10%
Bonney's Saw Vises.....50&10%

Parallel—

Bonney's.....50&5%
Fisher & Norris Double Screw....15&10%
Hollands'.....40@40&10%
Massey's Perfect.....20@25%
Massey's Clincher.....40@40&10%
Morrill's 25%
Miller's Falls.....45&10%
Parker's.....20@25%
Parker's Oval Slide.....50&10%
Parker's Victor.....30%
Prentiss.....20@25%
Sargent's.....70&10@70&10&10%
Simpson's Adjustable.....40%
Stephens'.....25@30%
Toles' Woodworking.....25%
Trenton.....40&5@40&10%

Saw Filers—

Bonney's, Nos. 2 & 3, $15.00... ...50&10%
Disston's D 8 Clamp and Guide, ₩ set $40..... .....25%
Reading.....40&10%
Stearns' Common, Nos. 0, 1, 2 & 3...50%
Stearns' Rubber Jaw, Nos. 10 & 33.33⅓%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3..... .....40%

Miscellaneous—

Bignall & Keeler Combination Pipe Vise.....60&5%

Parker's Combination Pipe:
87 Series.....60%
187 Series..... .....60&5%
No. 870..... .....40%

Wads—Price Per M.

B. E., 11 up	*60c*
B. E., 9 and 10	*70c*
B. E., 8	*80c*
B. E., 7	*80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B E., 11 and larger	*$1.70@1 75*
Ely's P. E., 12 to 20	*$3 00@3 25*

Dis. 30&5%

Wagon Boxes—

See *Boxes, Wagon.*

Wagon Jacks—

See *Jacks, Wagon.*

Ware, Hollow—

Aluminum—
S. S. & Co. Reduced List..... .....40%

Cast Iron, Hollow—

Stove Hollow Ware:
Ground..... ....60&10@60&10&10%
Unground... ..... 70@70&5%
White Enameled Ware:
Muslin Kettles ....75&10&5@80%
Boilers and Saucepans..60@60&5%
Tinned Boilers and Saucepans.60&5%
See also *Pots, Glue.*
Note.—See Trade Report.

Enameled—

Agate and Granite Ware, list Jan. 1, '94, revised Jan. 2, '95 .....40&10%
Second Quality.....70&10@70&10&10%
Ironclad Enameled Ware, Old list...70%
Never Break Enameled.....50&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch.....	6	7	8	9
Each.....	40c	45c	50c	60c

Steel Hollow Ware.

Avery Spiders & Griddles ....70@70&5%
Avery Kettles.....60@60&10&10%
Never Break Spiders and Griddles..... 70@70&5%
Never Break Kettles..... 60@60&10%
Solid Steel Spiders & Griddles. 70@70&5%
Solid Steel Kettles.....60@60&10%
Solid Steel Ware, Enameled.....50&10%

Silver Plated Hollow—

William Rogers Mfg. Co.....40&10&5%

Washboards—

Solid Zinc: ₩ doz
Crescent, family size, bent frame..$2.75
Red Star, laundry size, stationary protector.....$4.00
Double Zinc Surface:
Diamond, family size, stationary protector..... .....$2.75
Saginaw Globe, family size, stationary protector.....$2.50
Wilson, family size, bent frame...$2.50
Single Zinc Surface:
Naiad protector, family size, open back perforated..... .....$2.15
Diamond, protector family size, ventilated back $2.10
Saginaw Globe, protector, family size, ventilated back.....$2.00
Wilson, bent frame, family size, ventilated back $2.00
Eagle, protector, family size, ventilated back.....$1 85

Washers—
Leather, Axle—

Solid ..... 80d@10d 10@85%
Patent ..... 85@85d5%
Coil: ⅞ 1 1⅛ 1¼ *Inch.*
15c 14c 15c 17c *per 100*

Iron or Steel—

Size bolt ... 5-16 ⅜ ½ ⅝ ¾
Washers ... $4.75 3.50 2.75 2.50 2.50
In lots less than one keg add ¼c per lb., 5-lb. boxes add ½c to list.

Washer Cutters—
See *Cutters, Washer.*

Washing Machines—
See *Machines, Washing.*

Water Coolers—
See *Coolers, Water.*

Weaners—
Tyler's New Hatter—No. 1 ₱ doz. $3.45. No. 2, $3.70; No. 3, $4.00; No. 4 $4.80.
Tyler's Safety—Nos. 1 and 2, ₱ doz $ .70; No. 3, $2.00; No. 4, $2 30.

Weather Strips—See *Strips, Weather.*

Wedges—
Oil Finish ..... *lb. 2.70@2.85c*
Axe Finish ..... *lb. 3.00@3.10c*

Weights, Sash
Eastern: Carloads at factory..$17.00
Less than carloads at factory..$18.00
Western: Carloads at factory ..
$17.50@18.00
Less than carloads at factory
$18.50@19.00
Note—Some Foundries are naming higher prices.

Well Buckets, Galvanized
See *Pails, Galvanized.*

Wheels, Well—
8-in., $2.00; 10-in., $2.50; 12-in., $2.75

Wire and Wire Goods—
Market: Nos. 0 to 18:
Br. & Ann .....75d7½@75d&10%
Cop'd .....72½@72½d5%
Galv .....72½@72½d5%
Tin'd, Tin'd list....75d7½@75d&10%
Stone, Br. and Ann'd:
Nos. 16 to 18 ..... } *Quotations*
Nos. 19 to 26..... } *nominal.*
Nos. 27 to 36..... }
Annealed Wire on Spools.....
60d10@60d10d5%
Brass, list Feb. 26, '96.....*15%*
Copper, list Feb. 26, '96 .....*20%*
Cast Steel Wire..... *50%*
Steel Music Wire, 12 to 30, imported.
lb. 60@70c
Stubs' Steel Wire.....*$6.00 to £, 40%*
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—
Iron and Brass, list April 1, 1899....
50d10@50%
Note—The old high list is still used by many merchants, dis 90@90d..%

Wire Cloth and Netting—
Galvanized Wire Netting.....
80@80d10%
Painted Screen Cloth per 100 ft
1 25@1.50
See Trade Report

Wire Barb—See *Trade Report.*

Wire, Rope—See *Rope, Wire.*

Wrenches—

Agricultural	*80d5@80d10%*
Baxter's S	70@70&5%
Coes' Genuine	40&10&5&5&3%
Coes' "Mechanics'"	40&10&10&5&5&3%
Acme	60@60&5%
Aiken's Pocket (Bright)	$2.00@3.20
Alligator	70@70&10%
Bemis & Call's:	
Adjustable S	35&5%
Adjustable S Pipe	40%
Brigg's Pattern	30&10%
Combination Black	40&10%
Combination Bright	40&5%
Cylinder or Gas Pipe	55%
Extra Heavy	45%
Merrick's Pattern	50%
No. 3 Pipe, Bright	50%
Boardman's	33⅓%
Bull Dog, W. & B	70@70&10%
Donohue's Engineer	40&10%
Eagle	50&10%
Hercules	70&10@75%
Stevenson	60&10&10%

Wrought Goods—
Staples, Hooks, &c., list March 17, '92.....*85d10@90%*

Yokes, Neck—
Covert Saddlery Works, Trimmed...70%
Covert Saddlery Works, Neck Yoke Centers..... 70%

Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters'.. 20%

Zinc—
Sheet..... *lb. 8¼c*

PAINTS, OILS AND COLORS.—Wholesale Prices.

White Lead, Zinc, &c.

Lead, Foreign white, in Oil	8 @ 8¾
Lead, American White, in Oil:	
Lots of 500 ℔ or over	5½@ 5¾
Lots less than 500 ℔	@ 6¼
Lead, White, in oil, 25 ℔ tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price	@ 1½
Lead White, Dry in bbls	@ 5

Lead, American. Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.

Zinc, American, dry	₱ ℔ 3¾@ 4½
Zinc, French, S. & B. Red Seal	@ 7½
Zinc, French, S. & B. Green Seal	@7 7-10
Zinc, Paris, Red Seal	@ 8¼
Zinc, Paris, Green Seal	@ 9½
Zinc, Antwerp, Red Seal	@ 7½
Zinc, Antwerp, Green Seal	@ 8½
Zinc, V.M. in Poppy Oil, G. Seal lots of 1 ton and over	@10½
lots less than 1 ton	@10¾
Zinc, V.M. in Poppy Oil, Red Seal, lots of 1 ton and over	@ 9¼
lots of less than 1 ton	@ 9½

Discounts.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%. No discount allowed on less than 10 bbl. lots.

Dry Colors.

Black, Carbon	₱ ℔ 5 @10
Black, Drop, Amer	2½@ 5
Black, Drop, Eag	5 @10
Black, Ivory	10 @20
Blue, Celestial	₱ ℔ 6 @ 8
Blue, Chinese	30 @35
Blue, Prussian	28 @32
Blue, Ultramarine	5 @30
Brown, Spanish	½@ 1
Brown, Vandyke, Amer	1½@ 2½
Brown, Vandyke, Foreign	2½@ 5
Carmine, No. 40, in bulk	$2.20@2.25
Carmine, No. 40, in ℔ bottles	2.35@ ..
Carmine, No. 40, in ounce bot.	3.50@3.60
Green, Chrome, ordinary	2 @10
Green, Chrome, pure	18 @24
Lead, Red, bbls. and ½ bbls	@ 5¾
Lead, Red, kegs	@ 6
Litharge, bbls. and ½ bbls	@ 5¾
Litharge, kegs	@ 6
Ocher, French Washed	1 @ 1¾
Ocher, German Washed	4½@ 5
Ocher, American	₱ ton $8.00@17.00
Orange Mineral, English	₱ ℔ 8½@ 9½
Orange Mineral, French	10½@10⅝
Orange Mineral, German	8½@ 8½
Orange Mineral, American	@ 7¾
Red, Indian, English	4½@ 8½
Red, Indian, American	2½@ 3
Red, Turkey	4½@ 8
Red, Tuscan	7 @14
Red, Venetian, Amer.	₱ 100 ℔ .60 @70
Red, Venetian, English	$1.05@2.00
Sienna, Italian, Burnt and Powdered	₱ ℔ 4 @ 9½
Sienna, Ital., Raw, Powd	2½@ 7
Sienna, American, Raw	1½@ 1½
Sienna, American, Burnt and Powdered	₱ ℔ 1½@ 1½
Talc, French	₱ 100 ℔ 90 @1.50
Talc, American	40 @65
Terra Alba, French,	₱ 100 ℔ .. 90 @1.00
Terra Alba, English	75 @80
Terra Alba, American No. 1	75 @75
Terra Alba, American No. 2	45 @50
Umber, Turkey, Bnt. & Pow.	₱ ℔ 2½@ 3
Umber, Turkey, Raw & Powd.	2½@ 3
Umber, Bnt. Amer	1½@ 1½
Umber, Raw, Amer	1½@ 1½
Yellow, Carome	10 @25
Vermilion, American Lead	@10
Vermilion, Quicksilver, bbls. or kegs	@61
Vermilion, Quicksilver, bags	@62
Vermilion, Quicks'r, sm'r pkgs	@67
Vermilion, English, Import	70 @75
Vermilion, Artificial	5 @20
Vermilion Chinese	70 @75

Colors in Oil.

Black, Lampblack, Best	10 @13
Black, Lampblack, Common	7 @ 9
Blue, Chinese	35 @40
Blue, Prussian	25 @35
Blue, Ultramarine	16 @20
Brown, Vandyke	7 @12
Green, Chrome	7 @11
Green, Paris	17 @22
Sienna, Raw	7 @10
Sienna, Burnt	7 @10
Umber, Raw	6 @10
Umber, Burnt	7 @10

Miscellaneous.

Barytes, Foreign, ₱ ton	$18.00@20.00
Barytes, Amer. floated	18.00@20.00
Barytes, Crude	8.00@10.00
Chalk, in bulk	₱ ton 2.00@ ..
Chalk, in bbls	₱ 100 ℔ 35@
China Clay, English	₱ ton 10.00@17.50
Cobalt, Oxide	₱ 100 ℔ ..@ 1.76
Whiting, Common	₱ 100 ℔ .30@ .40
Whiting, Gilders	.40@ .45
Whiting, extra Gilders'	@ 55%

Paris Green:

Arsenic, kegs or casks	12 @13
Kegs, 100 ℔ @ 175 ℔	12½@13½
Kits, 14, 28, 56 ℔	13½@14¼
Paper Boxes, 2 @ 5 ℔	13½@14½
Paper Boxes, 1 ℔	14 @ 5
Paper Boxes, ½ ℔	15 @16
Paper Boxes, ¼ ℔	16 @17

Putty.

In barrels and ½ bbls	1 4-10@ 1½
In tubs	1½@1 6-10
In tin cans	1½@ 2
In bladders	1½@ 2

Spirits Turpentine.

In Southern bbls	@41½¢
In machine bbls	@42 ¢

Glue.

Low Grade	₱ ℔ 7 @ 9
Cabinet	11 @15
Medium White	10 @15
Extra White	15 @25
French	10 @25
Irish	10 @12½

Animal Fish and Vegetable Oils.

Linseed, City, raw	₱ gal. 43 @44
Linseed, City, boiled	45 @46
Linseed, Western, raw	@41
Linseed raw Calcutta seed	@58
Lard, Prime City, present make	43 @45
Lard, Extra No. 1	35 @47
Lard, No. 1	30 @32
Cotton-seed, Crude	22 @22½
Cotton-seed, Summer Yellow, prime	26½@27
Cotton-seed Summer Yellow, off grades	25½@26
Sperm, Crude	50 @52
Sperm, Natural Spring	53 @55
Sperm, Bleached Spring	58 @60
Sperm, Natural Winter	@57
Sperm, Bleached Winter	62 @65
Whale, Crude	@ ..
Whale, Natural Winter	@46
Whale, Bleached Winter	@49
Whale, Extra Bleached Win	@52
Menhaden, Crude, Sound	24 @25
Menhaden, Light Pressed	29 @30
Menhaden, Bleached Winter	@ 41
Menhaden, Extra Bleached	34 @ ..
Tallow, Western, prime	42 @43
Cocoanut, Ceylon	5½@ 6
Cocoanut, Cochin	@6¼ 6¼
Cod, Domestic	34 @36
Cod, Newfoundland	3 @40
Red Elaine	28 @30
Red Saponified	₱ ℔ 4 @ 4¼
Bank	₱ gal. .. @27
Straits	@28
Olive, Italian, bbls	58 @60
Neatsfoot, prime	42 @45
Palm, prime, Lagos	₱ ℔ 5¼@ 5¼

Mineral Oils.

Black, 29 gravity, 25@30 cold test	₱ gal. .. @ 7½
Black, 29 gravity, 15 cold test	@ 8½
Black, summer	@ 7
Cylinder, light filtered	13 @15½
Cylinder, dark filtered	11 @16
Paraffine, 23½@24 gravity	8¾@ 9
Paraffine, 25 gravity	@ 8¼
Paraffine, 28 gravity	@ 7¾
Paraffine, red, No. 1	@ 8¾

In small lots ⅛¢ advance.

THE IRON AGE.

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CURRENT METAL PRICES.

MAY 24, 1899.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ ₩ lb.; Square, 0.8¢ ₩ lb.
1 to 1⅞ in. round and square... ₩ lb. 1.80¢ @ 1.90¢
1½ to 4 in. x ⅜ to 1 in.
Refined iron:
1 to 1⅞ in. round and square.. ₩ lb. 1.85¢ @ 1.95¢
1½ to 4 in. x ⅜ to 1 in.
1½ to 4 in. x ¼ to 5-16 ₩ lb. 2.05¢ @ 2.15¢
Angles 2.10¢
Tees 2.20¢
Beams 2.25¢
Channels 2.25¢
Rods—⅜ and 11-16 round and sq'e. ₩ lb. 2.05¢ @ 2.15¢
Bands—1 to 6 x 3-16 to No. 12 ₩ lb. 2.45¢ @ 2.60¢
"Burden's Best" Iron, base price.. ₩ lb. 2.80¢
Burden's "H. B. & S. Iron, base price ₩ lb. 2.60¢
"Ulster" ₩ lb. 2.80¢
Norway Bars 3.50 @ 4.00¢
Norway Shapes 4.00 @ 4.25¢

Merchant Steel from Store—

	per lb.
Open Hearth and Bessemer Machinery	2.00 to 2.10¢
Toe Calk, Tire and Sleigh Shoe	2¾ to 3 ¢
Best Cast Steel, base price in small lots	7 ¢
Best Cast Steel Machinery, base price in small lots	5 ¢

Soft Steel Sheets—

¼ inch	2.60¢	No. 14	2 80¢
8-16 inch	2.70¢	No. 16	2.90¢
No. 8	2 70¢	No. 18	3.00¢
No. 10	2.70¢	No. 20	3.05¢
No. 12	2.75¢	No. 22	3.10¢

Sheet Iron from Store.

Black.

	Common American.	R. G. Cleaned American.
Nos. 10 to 16	₩ lb. 2.70	2.90¢
Nos. 17 to 21	₩ lb. 2.80	3.00¢
Nos. 22 to 24	₩ lb. 2.90	3.10¢
Nos. 25 and 26	₩ lb. 3.00	3.20¢
No. 27	₩ lb. 3.10	3.30¢
No. 28	₩ lb. 3.20	3.40¢

Russia, Planished, &c.

Genuine Russia, according to assortment ₩ lb. 10½¢
Patent Planished ₩ lb. A, 9¾¢; B, 8¾¢, net.
Patent Planished Sheet Steel ₩ lb. 8½¢

Galvanized.

	B. B.
Nos. 10 to 16	₩ lb. 12¢
Nos. 17 to 21	₩ lb. 13¢
Nos. 22 to 24	₩ lb. 14¢
Nos. 25 to 26	₩ lb. 15¢
No. 27	₩ lb. 16¢
No. 28	₩ lb. 17¢
No. 29	₩ lb. 19¢
No. 30	₩ lb. 21¢

36 in. 1¢ ₩ lb higher.

B. B. 10 & 10%

Foreign Steel from Store—

Best Cast	₩ lb. 14 ¢
Extra Cast	₩ lb. 16½ @ 17 ¢
Swaged, Cast	₩ lb. 16 ¢
Best Double Shear	₩ lb. 14 ¢
Blister, 1st quality	₩ lb. 12 ¢
German Steel, Best	₩ lb. 10 ¢
2d quality	₩ lb. 9 ¢
3d quality	₩ lb. 8 ¢
Sheet Cast Steel, 1st quality	₩ lb. 14 ¢
2d quality	₩ lb. 13 ¢
3d quality	₩ lb. 11 ¢
R. Mushet's "Special"	₩ lb. 46 ¢
" " " Annealed	₩ lb. 75 ¢
" " "Titanic"	₩ lb. 19 ¢
Hobson's Choice XX Extra Best	₩ lb. 35 ¢
Jessop Self Hardening	₩ lb. 40 ¢
Seamans' "Nelson" Steel	40 ¢
Hobson Self-Hardening	₩ lb. 40 ¢

METALS—

Tin—

	Per lb.
Duty.—Pigs, Bars and Block. Free.	
Banca, Pigs	28¢
Straits, Pigs	27¢
Straits in Bars	28¢

Tin Plates—

American Charcoal Plates.

Calland Grade:
IC, 14 x 20 $6.25@6.50
IX, 14 x 20 7.75@8.00
Melyn Grade:
IC, 14 x 20 6.00
IX, 14 x 20 7.25
Allaway Grade:
IC, 14 x 20 5.25
IX, 14 x 20 6.25

American Coke Plates—Bright—

IC, 14 x 20 108 lb. $4.50@4.60
IX, 14 x 20 5.40@5.50
IXX, 14 x 20 6.05@6.15

American Terne Plates—

IC, 20 x 28 $8.50@ 9.00
IX, 20 x 28 10.50@11.00

Tin Boiler Plates, American—

IXX, 14 x 26 112 sheets $10.50
IXX, 14 x 28 112 sheets 11.45
IXX, 14 x 31 112 sheets 12.65

Copper—

DUTY: Pig, Bar and Ingot and Old Copper free Manufactured, 2½¢ ₩ lb.

Ingot—

Lake 21½¢
Ansonia grade Casting 20½¢

Sheet and Bolt—

February 2, 1899. Prices, in cents per pound. Sheet 30 x 60. New.

Not wider than	Not longer than	And longer than	64 oz. & over, 30 lb. sheet, 30 x 60 and heavier.	32 oz. to 64 oz., 25 to 30 lb.	24 oz. to 32 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 12½ lb.	12 oz. and 13 oz. 9½ to 11 lb.	10 oz. and 11 oz. 7¾ to 9½ lb.	8 oz. and 9 oz. 6¼ to 7¾ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	22½	22½	23½	23½	23½	24½	25½	28½	31½
30	96	72	22½	22½	22½	22½	23½	25½	28½	31½	
30	.....	96	22½	22½	22½	22½	24½	28½			
36	72	.....	22½	22½	22½	22½	24½	26½	29½	32½	
36	96	72	22½	22½	22½	22½	24½	28½	31½		
36	120	96	22½	22½	22½	23½	25½				
36	.....	120	22½	22½	23½	24½					
48	72	.....	22½	22½	23½	24½	26½	29½	32½		
48	96	72	22½	22½	23½	25½	27½	31½			
48	120	96	22½	22½	24½	26½	30½				
48	.....	120	22½	23½	25½	28½					
60	72	.....	22½	23½	23½	25½	28½	33½			
60	96	72	22½	22½	24½	26½	31½				
60	120	96	22½	22½	25½	28½					
60	.....	120	22½	24½	25½	30½					
72	96	.....	22½	23½	25½	30½					
72	144	96	22½	24½	27½	32½					
72	.....	144	23½	25½	30½						
108	120	.....	23½	25½	31½						
108	.....	120	25½	26½							
wider than 108	144	.....	26½	28½							
	.....	144	27½	30½							

Bolt Copper, ⅜ inch diameter and over, ₩ lb. 21½¢
Circles, Segments and Pattern Sheets, 3¢ ₩ lb advance over price of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper 14 oz. ₩ square foot and heavier, 1¢ ₩ lb over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ lb over the foregoing prices.
All Polished Copper, 20 in. wide and under, 1¢ ₩ lb advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ ₩ lb advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₩ lb more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ lb. 26½¢
12 oz. and up to 14 oz. to square foot, ₩ lb. 27½¢
10 oz. and up to 12 oz., ₩ lb. 29½¢
Lighter than 10 oz., ₩ lb. 31½¢
Circles less than 8 in. diameter, 2¢ ₩ lb additional.
Circles over 13 in. diameter are not classed as Copper Bottoms.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.

Nos.	0000 to 8	9 and 10	11 and 12
	20¢	20½¢	20¼¢
Nos.	13	14	15	16
	20¼¢	20¾¢	21¢	21¼¢
Nos.	17	18	19	20
	21¾¢	22¢	22½¢	23¾¢

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.
Feb. 6, 1899. Net. Outside Diameter.

Stubs' W. G.	B. & S. W. G.	¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-11	3- 9	....	....	....	....	....	33	31	30	29	28	27	25	24
12	10	....	....	37	35	33	31	30	29	28	27	25	24
13	11	....	....	37	35	33	31	30	29	28	27	25	24
14	12	....	41	37	35	33	31	30	29	28	27	25	24
15	13	....	42	38	36	33	32	31	30	30	28	26	25
16	14	....	43	39	37	34	33	32	31	30	29	26	25
17	15	....	44	40	38	35	34	33	32	31	30	27	26
18	16	61	46	42	39	36	35	34	32	31	30	28	27
19	17	62	47	43	40	37	36	35	34	33	32	30	29
20	18-19	64	49	44	41	39	38	37	36	35	34	32	31
21	20	66	51	45	43	41	40	39	38	37	36	35	34
22	21	71	56	48	44	42	41	40	39	38	37	37	36
23	22	76	61	50	46	44	43	42	41	40	39	39	39
24	23	81	66	53	48	46	45	44	43	41	40	40	41
25	24	86	71	56	51	49	47	46	45	43	43	44	45

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional

Iron Pipe Sizes—Brass

¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
36	32	29	27	21	21	21	21	21	21	23	24	25	27	28¢ ₩ lb

Copper, Bronze or Gilding Tubes, 3¢ ₩ lb additional

Brazed Brass Tubing.

(*To No. 19, inclusive.*) Feb. 26 1896
Brown & Sharpe's gauge standard.

	Per lb.
Plain Round Tube, ¼ in. up to 2 in.	$0.35
" " 5-16 " ¼ "	.36
" " ⅜ " ⅝ "	.38
" " ½ " ⅝ "	.41
" " 5-16 " ⅝ "	.48
" " ¼ " 5-16 "	.65
" " 3-16 " ¼ "	1.00
" " ¼ " 3-16 "	1.50
Smaller than ¼ inch	Special
3 inch and larger	.40
Over 3 inch to 3½ inch, inclusive	.45
Over 3½ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.
Discount from list 20@25%

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2 12	12 14	14 16	16 18	18 20	20 22	22 24	24 26	
To No. 20, inclusive	.22	.23	.25	.27	.29	.31	.33	.36	
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38	
Nos. 27 and 28	.23	.25	.28	.30	.32	.34	.36	.39	

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	26 28	28 30	30 32	32 34	34 36	36 38	38 40	40
To No. 20, inclusive	.39	.42	.46	.50	.55	.60	.65	*
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68	
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71	
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75	

* Special prices not less than 80 cents.
Add ½¢ ₩ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 10%

Wire in Coils. List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gild'g bronze and copper
All Nos. to No. 10, inclusive	$0.28	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28¼
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.53	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.83
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.35
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 10%; Copper Wire, NET. List November 16, 96.
Spring Wire, 2¢ ₩ lb advance.

Spelter—Duty: In Blocks or Pigs, 1¢ ₩ lb

Western Spelter ...7¼@7⅝¢

Zinc.

Duty: Sheet, 2¢ ₩ lb.
600 lb casks ...8.40¢ | Per lb ...9¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb.

American Pig	4¼@4⅜¢
Bar	5¼¢
Pipe (full lengths), subject to discount 20%	6¼¢
Pipe (cut lengths), subject to discount 20%	7¼¢
Tin Lined Pipe, subject to discount 20%	12½¢
Block Tin Pipe, subject to discount 20%	37½¢
Sheet (full rolls) subject to discount 20%	7¼¢
Sheet (cut rolls (subject to discount 20%	8¼¢

Old Lead in exchange, 4¢ ₩ lb.

Solder.

½ & ¼, guaranteed ...17¢
No. 1 ...15¼@16¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₩ lb.

Cookson	₩ lb. 11½¢
Hallett's	₩ lb. 10½¢
U. S.	₩ lb. 10½¢

Aluminum—

Duty: Crude, 8¢ ₩ lb. Plates, Sheets, Bars and Rods 13¢ ₩ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting:
Small lots ₩ lb. 37¢
100-lb lots ₩ lb. 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:
Small lots ₩ lb. 34¢
100-lb lots ₩ lb. 32¢
Special casting Alloy, containing over 80% pure Aluminum:
Small lots ₩ lb. 35¢ | 100-lb lots ₩ lb. 30¢
Aluminum Rods, from ¾-in. diam. to 1 in. diam. ₩ lb. 58¢
Aluminum Sheet, B. & S. gauge, 50 lb or more.

Wider than	6-in.	14-in.	24-in.
And including	14-in.	24-in.	30-in.
	₩ lb.	₩ lb.	₩ lb.
Nos. 13 to 19	$0.38	$0.40	$0.43
No. 20	.40	.42	.45
Nos. 21 to 23	.42	.44	.47
No. 24	.42	.46	.49
No. 25	.43	.47	.50
No. 26	.43	.50	.55
No. 27	.44	.53	.58
No. 28	.44	.59	.60
No. 29	.45	.56	.65
No. 30	.46	.60	.73

Note.—Lots of less than 50 lb 5¢ ₩ lb extra.

Aluminum Wire, B. & S. Gauge.
Larger than No. 1 ₩ lb 55¢ | No. 17 to No. 20 ₩ lb 80¢
No. 1 to No. 8 ₩ lb 60¢ | No. 21 ₩ lb $1.15
No. 9 to No. 16 ₩ lb 65¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₩ lb 15½¢
Light and Tinned Copper	₩ lb 14½¢
Heavy Brass	₩ lb 11 ¢
Light Brass	₩ lb 9 ¢
Lead	₩ lb 3.95¢
Tea Lead	₩ lb 3½¢
Zinc	₩ lb 5½¢
No. 1 Pewter	₩ lb 17½¢
No. 2 Pewter	₩ lb 10 ¢
Tin Plate Scrap	₩ ton $3.50
Wrought Scrap Iron	₩ gross ton $9.75
Heavy Cast Scrap	₩ gross ton $8.50
Stove Plate Scrap	₩ gross ton $6 00
Burnt Iron	₩ gross ton $8.50